CMPT 411/721
Knowledge Representation and Reasoning
Fall 2019
Course Information

Instructor:
Jim Delgrande, T9015; email: jim
Office hours: tentatively Tuesday, Thursday 2:00-3:00

TA:
Turash Mosharraf; email: turash_mosharraf
Office hours: TBA

Lecture Hours: MWF 14:30 – 15:20
Lecture Room: M: AQ3159

Course Home Page: www2.cs.sfu.ca/CourseCentral/411/jim
Goal:
Introduction to Knowledge Representation and Reasoning in AI

• We’ll cover approaches used in KR to represent knowledge for different applications (dealing with e.g. diagnosis, uncertainty, object-centred representations)

• Also, methods to automate reasoning for these approaches.
Course Info

Prerequisites:

• None officially
  • The course focuses on logical reasoning, so exposure to logic would be good.
• A course in AI would be good, for familiarity with issues and goals of KRR.
• Interest
Course Grading

Grading

- Marks:
  - 40% - 4 assignments
  - 20% - midterm test;
  - 40% - final exam.

- No project, but some programming

- The final is Wed., Dec. 11 at 12:00
  - You *must* be able to attend the final
  - The final will be 2 hours
Course Grading

Letter Grades

Letter grades will be assigned as follows:

- A+: $\geq 90$;  
- A: 84-89;  
- A-: 80-83;  
- B+: 77-79;  
- B: 74-76;  
- B-: 70-73;  
- C+: 67-69;  
- C: 64-66;  
- C-: 58-63;  
- D: 50-57;  
- F: $< 50$.

Notes

- Grads and undergrads are treated as distinct cohorts
  - Grads may be asked to do some additional work on assignments.
    - If you are taking the concurrent B.Sc./M.Sc. program please let me know!
- In calculating a final mark, grades will not be scaled down.
  - They might be scaled up, but this is rare.
Course Policies

Coursework and Academic Honesty

• All course work must be done individually by each student.
• It’s ok to discuss general principles and directions for an assignment, but the solutions you submit must be yours i.e., you must have created them entirely on your own.
• Failing to do so will be considered academic dishonesty and appropriate penalties will be applied.
• If you’re in doubt, please ask.
Course Policies

Marking Issues

- For questions concerning the assignments (either for the interpretation of an assignment or for a grade), please
  - see the TA first, and then
  - talk to me if you still have concerns.

- If you have any concerns regarding grading of an assignment or a test, please notify myself or the TA within one week of
  the material being handed back.
Even More Course Policies

Office Hours and Email

• Please use email only for brief questions or for points of clarification.

• For longer questions or problems please see the TA or myself during office hours.

Due Dates
Unless announced otherwise, all assignments are due at 23:59 on the given date; and late assignments will not be graded.
Text and references

Textbook:

- We’ll be following the text by Ron Brachman and Hector Levesque, *Knowledge Representation and Reasoning* for maybe 50% of the course.
- Slides based on the text are available from the course home page.
- The book is available for downloading from the Elsevier site.
- Other slides and papers will be made available as needed.
Other references

References:
Here are some AI references that may come in handy.


  
  • The first edition is also pretty good: *Computational Intelligence*, David Poole, Alan Mackworth and Randy Goebel, Oxford University Press, 1998.

• Lots of other references...
Logic references:

- There are numerous good books that introduce logic. Two such books are:
  - *Introduction to Mathematical Logic*, E. Mendelson
  - *A Mathematical Introduction to Logic*, H. Enderton
- Various AI texts have a good introduction to logic.
  - Branchman and Levesque in particular is good.

Informal Intro to KR

- *Common Sense, the Turing Test, and the Quest for Real AI*, Hector J. Levesque, MIT Press, 2017
The following books contain further information on material covered in class, in case you’re interested in learning more.

Topics

Outline (may be subject to change):

1. Introduction
2. Logic: propositional and first-order. Expressing knowledge
3. Reasoning in logic: resolution
4. Horn clause logic: efficient reasoning
5. Description logics
6. Defaults/answer set programming
7. Argumentation
8. Abductive explanation
9. Reasoning about action (maybe)
10. Expressiveness / tractability