Course Information

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

TA:
Heng Liu; email: liuhengl
Office hours: TBA

Lecture Hours:  MWF 15:30 – 16:20
Lecture Room:  M: AQ3005; WF: RCB8100

Course Home Page:  www.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 focusses 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 Monday, April 16, at 08:30
  - You must be able to attend the final
  - Note that 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 will 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.
  - One such text is *Essentials of Artificial Intelligence*, Matt Ginsberg, Morgan Kaufmann, 1993.

Informal Intro to KR

- *Common Sense, the Turing Test, and the Quest for Real AI*, Hector J. Levesque, MIT Press, 2017
Advanced KR books

The following books contain further information on material covered in class, in case you’re interested in learning more.

- *Knowledge in Action*, Raymond Reiter, MIT Press, 2000
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: forward and backward reasoners
5. Description logics
6. Defaults/answer set programming
7. Probabilities (maybe)
8. Argumentation
9. Abductive explanation
10. Reasoning about Action
11. Planning
12. Expressiveness / tractability