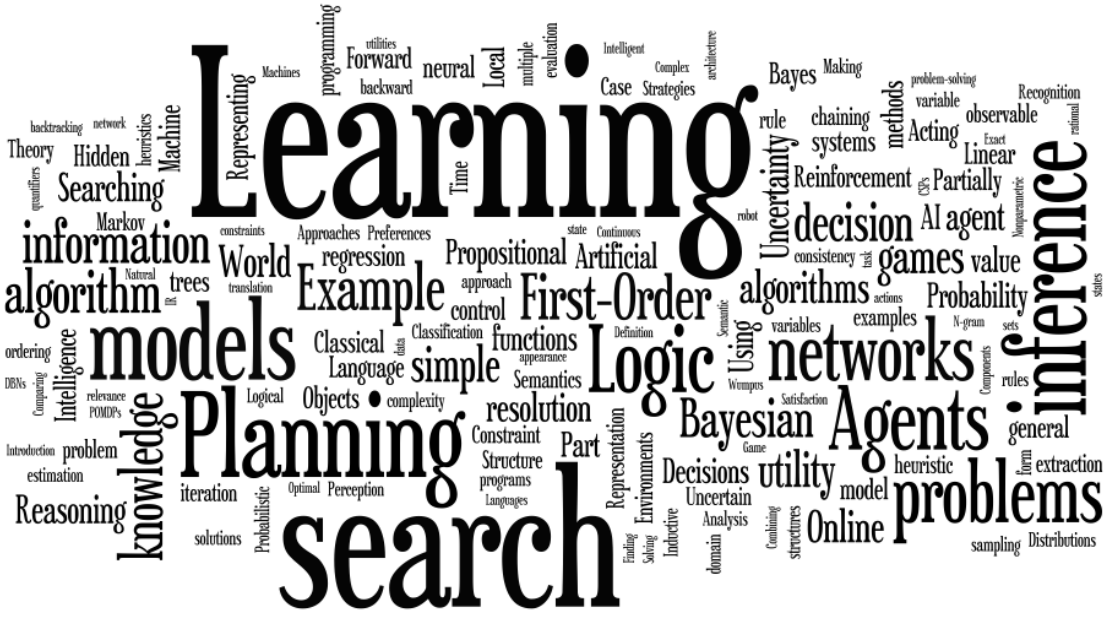
CSCI 260: Artificial Intelligence

Syllabus – Spring 2011

Ben Coleman
coleman@cs.moravian.edu
214 PPHAC

Office Hours: W 2:30-4:00; R1:30-3:30
or by appointment
Office Phone: 610-625-7781

Course Description



A survey of topics and methods for emulating natural intelligence using computer-based systems. Topics include: solving problems by search, solving problems as constraint satisfaction problems, logic program, and probabilistic inference using Bayes' Rule.

Course Goals

Upon completion of this course, a successful student will be able to:

- Formulate problems as a collection of states and actions and describe classic algorithms to search for solutions.
- Describe techniques to solve zero-sum games.
- Model constraint satisfaction problems and describe techniques to solve such formulations.
- Apply propositional and first-order logic.
- Describe unification, chaining, and resolution.
- Describe how Bayes' Rule is used to make probabilistic inference.

Required Texts

In addition to the following required text, supplementary readings will be given periodically during the semester.

- *Artificial Intelligence: A Modern Approach, Third Edition* by Stuart Russell and Peter Norvig.

You should expect to spend about an hour before each class session working through the readings. This means reading the text for detail and working to learn vocabulary – not just skimming through the material before class.

Graded Material

- **Homework** - The goal of homework problems is for you to practice using the current course content and to explore the topics in more detail. Problems will be assigned nearly every class session and generally will be due the next class.

  Homework problems will be graded on a scale between zero and three:

  - **3**: You completed the problem perfectly or nearly perfectly.
  - **2**: Your solution had non-trivial problems.
  - **1**: You tried the problem, but either didn't get very far or made serious mistakes.
  - **0**: You failed to turn anything in for the problem.

  At the end of the semester, your average homework problem score will translate into an actual letter grade as follows:

≥ 2.5	A
≥ 2	B
≥ 1.5	C
≥ 1	D
< 1	F

  Essentially, this scale means that you must earn threes on at least half of the problems to be in the A range (with the remainder of your scores being twos). Plusses and minuses will be used within each range.

- **Tests** - Two in-class tests will be given during the semester on Friday, February 25 and Wednesday, April 20. You may only re-schedule a test for college-approved absences or documented illness. In either case, you must contact me *before* the beginning of the test.

- **Project** - You will work with a group on a semester-long project. The group will give two presentations on their project and produce a final write-up. The first presentations (Monday, February 28 and Wednesday, March 2) will describe the problem each group is working on. Final presentations (Wednesday, April 27 and Friday, April 29) will describe the results of the groups' work. The final write-up will be due on Friday, April 29. Further details about all aspects of this project will be distributed in class.

- **Final** - The final exam will be giving in class on Tuesday, May 3 beginning at 8:30 A.M. Any change to the final exam schedule must be approved by both me and the dean of students.

Grade Determination

- Homework 40%
- Tests 20%
- Project 25%
- Final 15%

All grades will be computed on the standard scale using plusses and minuses

Course Policies

- **Responsibilities** – Your attendance is expected at each class meeting. You are also responsible for the contents of reading assignments, handouts, class activities, and class email.
- **Late Policy** – I understand that life sometimes gets in the way of getting work done. Consequently, late assignments will be accepted without penalty in the class after the assignment was due. However, this policy should not be used as a crutch, and if you frequently use it I will deduct from your grade. After the next class session, late work will not be accepted unless there are exceptional circumstances.
- **Extensions** – In a similar vein, I am generous with extensions on work if you approach me *before* the day the assignment is due.
- **Academic Honesty** – Except on tests, you are *encouraged* to discuss the material and work with other students in the course. This policy does not allow you to copy another student's work verbatim – you must produce your own code or write-up of the material. Work together to learn the concepts, but keep in mind that you are ultimately responsible for the material on the tests.
- **Disabilities** – If you have a disability that may affect your performance in this course, please contact me immediately to discuss academic accommodations.

Course Schedule

Date	Reading	Topic
M Jan 17		• Day 1 Activities
W Jan 19	• 3.1 - 3.2	• Problem Formulation
F Jan 21	• 3.3 - 3.4	• Uninformed Search
M Jan 24	• 3.5 - 3.6	• Heuristic Search
W Jan 26	• 4.1 - 4.1.3	• Local Search
F Jan 28	• 4.1.4	• Genetic Algorithms
M Jan 31		• Genetic Algorithm Examples
W Feb 2		• Search Wrap-Up
F Feb 4	• 5.1 - 5.2	• Minimax Algorithm
M Feb 7	• 5.3	• Alpha-Beta Pruning
W Feb 9	• 5.4	• Evaluation Functions • Move Ordering
F Feb 11	• 5.7 - 5.8	• State of the Art
M Feb 14	• 6.1	• Constraint Satisfaction Problems
W Feb 16	• 6.2	• Inference
F Feb 18	• 6.3	• Backtracking
M Feb 21	• 6.4 - 6.5	• Local Search • Problem Structure
W Feb 23		• CSP Wrap-Up
F Feb 25		• Test #1
M Feb 28		• Project Presentations
W Mar 2		• Project Presentations
F Mar 4	• 7.1 - 7.2	• Wumpus World
M Mar 7 – F Mar 11		• Spring Break
M Mar 14	• 7.3 - 7.4	• Logic
W Mar 16	• 7.5 - 7.6	• Propositional Theorem Proving
F Mar 18	• 7.7	• Agents and Propositional Logic
M Mar 21		• Logic Wrap-Up
W Mar 23	• 8.1 - 8.2	• First Order Logic
F Mar 25	• 8.3 - 8.4	• Using First Order Logic
M Mar 28		• First Order Logic Wrap-Up

Date	Reading	Topic
W Mar 30	• 9.1 - 9.2	• Unification
F Apr 1	• 9.3 - 9.4	• Chaining
M Apr 4	• 9.5	• Resolution
W Apr 6		• Logic Programming
F Apr 8	• 13.1 - 13.2	• Probability
M Apr 11	• 13.3 - 13.4	• Probabilistic Inference • Independence
W Apr 13	• 13.5	• Bayes' Rule
F Apr 15	• 13.6	• Bayes Example
M Apr 18		• Probability Wrap-Up
W Apr 20		• Test #2
F Apr 22 – M Apr 25		• Easter Break
W Apr 27		• Project Presentations
F Apr 29		• Project Presentations

The details of this syllabus and schedule are subject to change based on our progress through the material.