CSCI 3202 Introduction to Artificial Intelligence
Fall 2015
Instructor: Dr. Rhonda Hoenigman
Rhonda.hoenigman@colorado.edu
ECOT 738 (Engineering Center)
303-492-0084

Office Hours:
W-Th-F, 11am - 12pm, ECOT 738.

Grader:
Yogitha Mahadasu (Yogitha.Mahadasu@colorado.edu)

Lectures: M-W-F 4-4:50pm in EKLC E1B20.

Texts:
Russell, S. and Norvig, P. Artificial Intelligence: A Modern Approach. Prentice Hall, Saddle River, NJ. 2010.

Other Materials:
Course materials, such as lecture notes and assignments, will be available in electronic form on the Moodle site for the course: http://moodle.cs.colorado.edu/. The enrollment key is ai3202.

Portions of this class will follow the Berkeley CS188 artificial intelligence course: http://inst.cs.berkeley.edu/~cs188/fa11/lectures.html. Available at that course are taped lectures (by another instructor) and slides (that I won't be using) that you may find useful.

Course Description:
Provides a survey of artificial intelligence techniques of search, knowledge representation, and reasoning, probabilistic inference, machine learning, and natural language processing algorithms that are used in modern artificial intelligence systems. Students are introduced to both the theory of the algorithms and the challenges of implementing them in a modern programming language.

Prerequisites or co-requisites: CSCI 2270 Data Structures and Algorithms, CSCI 2824 Discrete Structures

Grading Policy:
Written Assignments 20%
Programming Assignments 40%
Exams 40% (midterm and a final, equally weighted)

You must get a 60% average on your exams to pass the class, regardless of your grades on your assignments.

Github:
You will be using github in this class for all programming assignments. If you're not familiar with github, have no fear, the first assignment will include steps for creating a github account and uploading some files.

Python:
All programming assignments will be written in Python. If you're not familiar with this language, embrace this requirement as a chance to learn a new language.

Approximate Lecture Schedule:

Date	Topic	Book pages
Week 1	Introduction to AI. Agents, perception, and decision making, state space. **Assign programming: intro to Github and Python**	Ch. 1. Ch. 3.1-4
Week 2	Breadth-first and depth-first search, greedy search, Uniform cost search. **Assign written: algorithm eval for BFS, DFS, UCS.**	Ch. 3.5-6
Week 3	A* search, optimality, heuristics. **Assign programming: Implement BFS, DFS, UCS, A*, heuristic.**	Ch. 3.5-6
Week 4	Game trees, min-max search. **Assign written: min-max eval on gerrymandering.**	Ch. 5.2-5
Week 5	Markov decision processes. **Assign programming: MDP**	Ch. 16.1-3
Week 6	Reinforcement learning. **Assign written: value iteration and reinforcement.**	Ch. 17.1-3
Week 7	Midterm, Probability, Bayes Nets	Ch. 13.1-5, Ch. 14.1-2,4
Week 8	Bayes Nets. **Assign written: Bayes nets.**	Ch. 14.1-2,4
Week 9	Bayes Nets. **Assign programming: Bayes nets.**	Ch. 14.1-5
Week 10	HMMs. **Assign written: HMMs**	Ch. 15.2,5
Week 11	HMMs, Viterbi.	Ch. 15.2,5,6

	Assign programming: HMMs and Viterbi.	
Week 12	Machine Learning, supervised and unsupervised learning. **Assign written: supervised and unsupervised learning.**	
Week 13	Classification, k-means. **Assign programming: supervised and unsupervised classifier.**	Ch. 15.2,5,6
Week 14	Decision diagrams/Information theory, entropy. **Assign programming: decision tree.**	Ch. 15.1-3,6
Week 15	Machine Learning	

Other Information:

1. Late homework is not accepted in CSCI 3202 except in the case of documented personal, family, or medical emergency. Once the deadline has passed, your homework is late and cannot be turned in.
2. Written work must be neat and readable, with adequate spacing and margins. Your name, the date, and your class ID must be at the top right of the first page. Code files should have your name, date, and homework number included as comments at the top of the file.
3. Attendance at all class meetings is highly recommended. You are responsible for knowing the material presented during class, even if you were not in attendance when the material was presented.
4. Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance. You can find the details at www.colorado.edu/policies. You must notify me of any such conflicts by the end of the first week of classes so we can work out alternatives.
4. A limited amount of printing may be required in this class. You need to ensure that your printing account has sufficient funds for this. Your initial allocation may deplete quickly, depending on your other printing activities. If this causes problems, please come see me.
5. If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services by the end of the second week of classes so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact info: www.colorado.edu/disabilityservices, 303-492-8671, Willard 322. That office also maintains guidelines about temporary medical conditions or injuries.
6. In Class Expectations: It is my expectation that each of you will be respectful to your fellow classmates and instructors at all times. In order

to create a professional atmosphere within the classroom, you are expected to:

* Arrive to class on time
* Turn off your cell phone (talk and text).
* Bring your laptop to class if you have one to participate in classroom activities. Please restrict laptop use to these activities only, no email, Facebook, Youtube, etc.
* Put away newspapers and magazines
* Refrain from having disruptive conversations during class
* Remain for the whole class; if you must leave early, do so without disrupting others
* Display professional courtesy and respect in all interactions related to this class

Compliance with these expectations will assist all of us in creating a learning community and a high quality educational experience. The University of Colorado Classroom behavior policy compliments these classroom expectations:

University of Colorado Classroom Behavior Policy:

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at www.colorado.edu/policies/classbehavior.html or www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

7. Out of Class Expectations: Though many of the above stated policies address academic climate within the classroom, these policies should also be upheld outside of the classroom. As a member of the CU community you are expected to consistently demonstrate integrity and honor through your everyday actions. Faculty, TAs, and staff members are very willing to assist with your academic and personal needs. However, multiple professional obligations make it necessary for us to schedule our availability. Suggestions specific to interactions with faculty and staff include:

* Respect posted office hours. Plan your weekly schedule to align with scheduled office hours.
* Avoid disrupting ongoing meetings within faculty and staff offices. Please wait until the meeting concludes before seeking assistance. Respect faculty and staff policies regarding use of email and note that staff and faculty are not expected to respond to email outside of business hours. Send email messages to faculty and staff using a professional format. Tips for a professional email include:
* Always fill in the subject line with a topic that indicates the reason for your email to your reader.
* Respectfully address the individual to whom you are sending the email (e.g., Dear Professor Smith).
* Avoid email or text message abbreviations.
* Be brief and polite.

* Add a signature block with appropriate contact information.
* Reply to email messages with the previously sent message. This will allow your reader to quickly recall the questions and previous conversation.

8. The University of Colorado at Boulder policy on Discrimination and Harassment, which can be found at www.colorado.edu/policies/discrimination.html, and the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes she or he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at www.colorado.edu/odh
9. IMPORTANT!!! All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include cheating, plagiarism, academic dishonesty, fabrication, lying, bribery, and threatening behavior. Plagiarism includes using material from outside sources (e.g., the web) without clear identification and citation.

This class also has specific guidelines for what is considered collaboration and what is considered academic dishonesty. The collaboration policy is given here:

CSCI 3202 Spring 2015 Collaboration Policy
The Computer Science Department at the University of Colorado at Boulder encourages collaboration among students. To support students in collaboration the Department has created a Collaboration Policy that makes explicit when their collaborative behavior is within the bounds of collaboration and when it is actually academic dishonesty, and therefore a violation of the University of Colorado at Boulder's Honor Code.

Students are most successful when they are working with other students to understand new concepts. The ultimate goal is that you fully understand the code you develop and be able to collaborate with others in a mutually beneficial way.

Unless otherwise specified, you may make use of outside resources (internet, other books, people), but then you must give credit by citing your sources in the comments inside your code. Use of outside resources does not include downloading complete, or almost complete, solutions to an assignment, whether you cite the source of the solution or not. This is considered plagiarism and violates the University's Honor Code policy.

Examples of citing sources include:

```
// Modified version from https://github.com/Phhere/MOSS-PHP
// Adapted from Program #7.2 in book "Accelerated C++" by Stroustrup
```

```
            // Worked with Joe Smith from class to come up with algorithm for
sorting
            // Received suggestions from stackExchange website (see
http://….)
```

A good rule of thumb: "If it did not come from your brain, then you need to attribute where you got it."

Collaboration Exceptions
Certain homework, quizzes, or exams may be required to be completed without outside resources (see course overview for details). In these cases it is your responsibility to know the extent of approved resources and use only those that have been specifically allowed. Use of outside resources in these cases would violate the collaboration policy.

Examples of violating the Collaboration Policy
Some examples of violating the collaboration policy include (but are not limited to):

- Sharing a file with someone else.
- Submitting a file that someone else shared with you.
- Stealing a copy of someone else's work and submitting as your own (even with modification).
- Copying or using outside resources to solve a component of a larger problem and not citing your sources.
- Copying or using an entire solution that you didn't generate, regardless of whether you cited your sources.

Examples of collaborating correctly:
- Asking another student for a helpful suggestion.
- Reviewing another student's code for issues/bugs/errors.
- Working together on the whiteboard (or paper) to figure out how to approach and solve the problem. In this case you must include that person's name in your collaboration list at the top of your submission.

One way to know you are collaborating well is if everyone fully understands the code that is developed. If you do not understand what is in your code or why certain parts of the code are included, you need to ask someone to clarify! This collaboration policy requires that you be able to create the code (or solve the problem) on your own before you submit your assignment. Any discovered incidents of violation of this collaboration policy will be treated as violations of the University's Academic Integrity Policy and will lead to an automatic academic sanction in the course and a report to both the College of Engineering and Applied Science and the Honor Code Council. Students who are found to be in violation of the Academic Integrity Policy can be subject to non-academic sanctions as well, including but not limited to university probation, suspension, or expulsion.
Other information on the Honor Code can be found at www.colorado.edu/policies/honor.html and www.colorado.edu/academics/honorcode.

Collaboration boundaries are hard to define crisply, and may differ from class to class. If you are in any doubt about where they lie for a particular course, it is your responsibility to ask the course instructor.

10. GRADES follow the standard percentage breakdown for the College of Engineering:

93%-100%	A
90%-93%	A-
87%-90%	B+
83%-87%	B
80%-83%	B-
77%-80%	C+
73%-77%	C
70%-73%	C-
67%-70%	D+
63%-67%	D
60%-63%	D-
0%-60%	F