COMP 372 — Artificial Intelligence — Fall 2014

CRN 15793

Instructor: Phillip Kirlin
Meetings: Tu/Th, 11–12:15, Kennedy 208
Course website: http://www.cs.rhodes.edu/~kirlinp/courses/ai/f14
Email: kirlinp@rhodes.edu (please include "AI" somewhere in the subject)
Office hours: Mon/Wed 9:45-11:15, Tue 2-3, Thu 3-4, or by appointment, in Ohlendorf 420.

Course Overview: This course presents an overview of the fundamental techniques used in artificial intelligence today. Topics will include a subset of the following: agents, intelligent search, constraint satisfaction, game playing, utility theory, decision making under uncertainty, reinforcement learning, probabilistic reasoning, and machine learning. Other topics may be presented with student interest and as time permits.

Text: Russell and Norvig, *Artificial Intelligence: A Modern Approach*, third edition, Pearson, 2010. (You may use the second edition at your own risk; it has most of what is needed, though the third edition has improved pseudocode and better sections on learning.)

Prerequisites: COMP 241 (Data Structures and Algorithms) is required. COMP 172 (Discrete Structures) is highly suggested, but not required. In particular, knowledge of the data structures taught in 241 (such as graphs) will be assumed, as will the mathematical concepts (such as elementary probability theory) taught in 172.

Course Work:

	Tentative weight	Tentative date
Written homework	20%	
Programming projects	30%	
Midterm	25%	Tuesday, October 28, in class
Comprehensive final exam	25%	Monday, December 15, 1pm

Final letter grades of A–, B–, C–, and D– are guaranteed with final course grades of 90%, 80%, 70%, and 60%, respectively. If your final course grade falls near a letter grade boundary, I may take into account class participation, attendance, and/or improvement during the semester.

Any written assignments are due at the beginning of class on the assigned date. Programming projects are due on Moodle by their deadlines. In general, late work will not be accepted, so turn in whatever you have completed by the due date. Homework assignments should be written neatly. Poorly written work will not be graded. All pages of assignments should be stapled together.

Programming projects may be coded in the language of your choice. If you use anything other than the versions of Python or C++ installed on the lab machines, you must (a) get approval from me before beginning to code, and (b) give me detailed instructions on how to compile and execute your code. I will generally approve any language, unless it makes the particular assignment in question trivially easy. Specific assignments may require use of a particular language.

If you have a valid reason for a makeup exam, inform your instructor as soon as you know. A valid reason is a medical emergency, a death in the family, religious observation, a college-

sponsored off-campus activity, and, quite frankly, very little else. Generally, assignment extensions will only be granted for *unplanned* circumstances (e.g., the first two reasons above).

Office Hours: In addition to regular office hours, am also available immediately after class for short questions. You never need an appointment to see me during regular office hours; you can just come by. Outside of regular office hours, feel free to stop by my office, and if I have time, I'll try to help you. If I don't have time at that moment, we'll set up an appointment for a different time. Don't be shy about coming by my office or sending me email if you can't make my regular office hours. I always set aside time each week for "unscheduled" office hours.

Attendance: Attendance is expected for each class. If your attendance deteriorates, you will be referred to the dean and asked to drop the course. Attendance, participation, and apparent overall improvement trend may be considered in assigning a final grade. Attendance will be checked each class lecture period. After five unexcused absences, each additional absence will reduce the final grade for the course by one letter grade.

Class Conduct:

- I encourage everyone to participate in class. Raise your hand if you have a question or comment. Please don't be shy about this; if you are confused about something, it is likely that someone else is confused as well. Teaching and learning is a partnership between the instructor and the students, and asking questions not only helps you understand the material, it also helps me know what I'm doing right or wrong.
- Do not use your cell phone while in class, and keep the ringer on silent.
- If you cannot make it to class for whatever reason, make sure that you know what happened during the lecture that you missed. It is your responsibility, and nobody else's, to do so. The best way to do this is to ask a classmate.
- If you have to leave a class early, inform the instructor in advance. It is rude to walk out in the middle of a lecture.

Students With Disabilities: If you have a documented disability and wish to receive academic accommodations, please contact the Office of Student Disability Services at x3885 as soon as possible.

Collaboration: Students should talk to each other about the subject matter of this class and help each other. It is fine to discuss the readings, lectures, and problems and ask questions about them. I encourage such questions in class as well as elsewhere. However, there is a line past which you must not go, e.g., copying a solution from a fellow student, book, website, etc. will cause you to fail the course, or worse. If a significant part of one of your solutions is due to someone else, or something you've read, then you must acknowledge your source. Failure to do so is a serious academic violation. Of course, even after you acknowledge your source you must still understand your solution and write it in your own words. Copying a solution from the web, a book, or classmate will result in failure even if you acknowledge your source, unless you put it in quotation marks and say something like, "Here is Amy's solution, but I don't understand it enough to absorb it and write it in my own words." However, this won't get you much — if any — credit.

A good rule of thumb to follow is to not write up any solutions to homework assignments or programming projects in a group. Feel free to discuss things with your classmates, but the solution should be written alone.

Academic Integrity: Plagiarism, cheating, and similar anti-intellectual behavior are serious violations of academic ethics and will be correspondingly penalized. If you are concerned about a possible violation of this kind, please talk with me. I understand that being a student at Rhodes can be stressful sometimes and you will have many demands on your time. However, I would much rather have you turn in a partially-completed assignment or do poorly on a test than have you violate the Rhodes Honor Code. I can — and very much want to — help you if you don't understand the material, but violations of academic integrity will be dealt with harshly.

Unless otherwise specified, everything you submit in this course must be your own work and represent your individual effort. These are all included in the definition of reportable Honor Code violations for this course: copying all or part of a solution to a problem, downloading a solution from the internet and submitting it as your own, having someone else provide the solution for you, or allowing someone else to copy from you. If you have any doubt about what type of behavior is acceptable, please talk with me.

Tentative Course Schedule

- Uninformed search (DFS, BFS)
- Heuristic search (A* algorithm)
- Local search (Hill climbing, simulated annealing)
- Constraint satisfaction problems (AC-3 algorithm)
- Adversarial search (Minimax algorithm, alpha-beta pruning)
- Probabilistic reasoning
- Bayes nets
- Naive Bayes classifiers
- Markov chains, hidden Markov models
- Reinforcement learning (value iteration, Q-learning)