CSCI–4150 Introduction to Artificial Intelligence
Fall 2002

classroom:	Sage 3303	
times:	Tuesday and Fridays, 2:00 – 3:50pm	
text:	Russell & Norvig, "Artificial Intelligence: A Modern Approach"	
www:	`http://www.cs.rpi.edu/courses/fall02/ai`	
Instructor:	Prof. Wes Huang email: `whuang@cs.rpi.edu` office: Amos Eaton 111	
TAs:	Houda Lamehamedi email: `lamehh@cs.rpi.edu` office: Amos Eaton 219	Dave Siebeceker email: `siebed@cs.rpi.edu` office: Lally 003A
Secretary:	Shannon Bornt office: Amos Eaton 132	(see Ms. Bornt for missed handouts and turning in late work)

We will set regular office hours next week; they will be announced in class and posted on the course home page. Prof. Huang's office hours for the the first week of classes are Wednesday August 28, 4–6pm, and Friday August 30, 9–11am. Dave's office hours this week are Thursday August 29, 2–4pm.

Course description

This course is an introduction to the theory and practice of Artificial Intelligence. We will be studying techniques for solving problems and making intelligent decisions. The first half of the course will focus on the foundations of Artificial Intelligence: search and logic. The second half of the course will focus on machine learning techniques, including decision trees, reinforcement learning, and neural networks. Knowledge representation and uncertainty will be addressed in conjunction with several topics during the semester.

Students will implement many of the algorithms we cover in programming assignments. The implementation language for these assignments will be Scheme (a dialect of LISP) which will be taught in the first two weeks of the course.

Course activities

Assignments There will be seven assignments, most (if not all) of which will include a programming component. Assignments are to be done individually, with the possible exception of one or two assignments in the second half that will be done in teams or pairs. The value of each assignment may vary with its length and difficulty; however, you can expect a two week assignment to be worth about twice as much as a one week assignment. All assignments count towards the assignment component of your final grade. Assignments will be due on Fridays.

Quizzes There will be weekly quizzes every Tuesday starting September 10. These are intended to be short (about 15 minutes); they will serve to reinforce your understanding of the course material over the semester. There are 12 quizzes scheduled in the fall semester. I will drop the lowest three quiz scores from the quiz component of your final grade. *No make-up quizzes will be given!*

Final Examination There will be a final examination to be scheduled by the registrar during the examination period (December 11–13 and 16–17).

Grading

Your final grade will be determined according to the following (tentative) breakdown:

50%	Assignments
25%	Quizzes
25%	Final examination

To ensure that students completing this course have breadth and experience commesurate with the scope of the course, students are required to receive a passing grade on at least four of Assignments 2–7 in order to receive a passing grade for the course.

Course policies

The following policies will be clarified or revised as necessary during the semester. The course home page will be updated with the current versions.

Late work

Unless you make *prior* arrangements with the instructor, assignments are due at the beginning of class (2:00pm) on the day they are due.

Within a certain time period after the deadline, I believe there is value in encouraging students to complete an assignment, so I do accept late work. However, late work places an additional burden on the teaching staff and is unfair to those students who turn in their work on time.

The late policy for this class is a two-tiered system. Here are the details.

1. A late assignment turned in by the first-tier late deadline will be assessed a 7.5% penalty. A late assignment turned in by the second-tier late deadline will be assessed a 15% penalty.

2. For electronic program submission, the first-tier late deadline is midnight Saturday night, and the second-tier late deadline is midnight on the following Tuesday night.

3. Late written work must be turned in to Shannon Bornt in Amos Eaton 132 during business hours (8:30–5:00). (If she is not there, turn it in at the CS main office in Lally 207, but make sure you give it to a secretary who will timestamp it.) We are not planning to accept written work electronically.

4. For late written work, the first-tier late deadline is the following Monday at 10:00am, and the second-tier deadline is the following Wednesday at 10:00am.

5. You may sign up in class for an automatic extension of the regular assignment deadline for electronic submission only. The extension will be until midnight that (Friday) night.

Please note that a two week assignment will generally not be a "one night" assignment and manage your time accordingly.

Academic honesty

I encourage you to discuss the readings and assignments and to prepare for quizzes and the final examination with others. However, I expect that any assignment, quiz, or examination that you turn in to be your own work — the product of your understanding of the course material and your own efforts in completing the assignment or examination.

In particular, academic honesty has sometimes been a problem on programming assignments. Students naturally want to work together, and they can learn a great deal by doing so. Getting help is often the best way to interpret error messages and find bugs, even for experienced programmers. In response to this, the following rules will be in force for programming assignments:

- Students may work together in designing algorithms, in interpreting error messages, in discussing strategies for finding bugs, but *not* in writing code or detailed debugging.
- Students may not share code, they may not copy code, and they may not discuss code in detail while it is being written or afterwards. This extends until after the second-tier late deadline.
- Students may not "show" their code to other students as a means of "helping them".

We use an automatic code comparison tool to help spot assignments that have been submitted in violation of these rules. However, a final detemination is made by the instructional staff after reviewing the evidence.

The Rensselaer Handbook of Student Rights and Responsibilities defines several types of academic dishonesty, all of which are applicable to this class, as well as procedures for responding to academic dishonesty. While a first infraction may result only in a 0 for that assignment or a reduction in that student's final grade, a repeated or egregious infraction may result in the student receiving a failing grade for this course.

Please contact the instructor if there is any question about academic (dis)honesty.

Attendance

You are responsible for knowing all material covered in class. If you should miss a class, please contact a classmate first to learn what was covered that day. We will attempt to keep the syllabus on the course home page up to date.

Since there are no make-up quizzes, you must attend class to take the quizzes.

Grading appeals

If you disagree with the grading on an assignment or the midterm examination, you should appeal to the TA first. Such appeals must be made within two weeks after the assignment is returned.

Resources

We will be making extensive use of the course home page and WebCT during the semester. Handouts will be available online through this page as well as other information about the course.

There will be a number of items placed on reserve at the library. The course home page will contain a list of these items.

The instructor and TAs will hold regular office hours; you can feel free to drop in during these times. You may also make an appointment to see the instructor or TA(s) outside of these times.

Changes

There may be changes to the policies, deadlines, and schedule described in this syllabus. You can expect me to give you reasonable notice of any changes. All changes will be announced in class and appear on the course web page.

Tentative Schedule

Week		Date		Topic	Reading	Assignment
1	M	Aug	27	Intro: What is AI? Scheme I	1	A0 out
	R	Aug	30	Intro: Overview of AI techniques; Scheme II	2	A1 out
2	M	Sep	3	Search: Blind search; Scheme III	3.1–5	
	R	Sep	6	Search: Blind search; Scheme III	3.5–6	A1 due; A2 out
3	M	Sep	10	Search: Heuristic search; Scheme IV	4.1–2	Quiz 1
	R	Sep	13	Search: Heuristic search; Scheme IV	4.3	A2 due; A3 out
4	M	Sep	17	Search: Constraint satisfaction searches	3.7, pp. 104–5, 114	Quiz 2
	R	Sep	20	Search: Iterative improvement searches	4.4	
5	M	Sep	24	Search: Game playing search	5.1–3	Quiz 3
	R	Sep	27	Search: Game playing search	5.4–5	A3 due; A4 out
6	M	Oct	1	Logic: Introduction; Propositional logic	6	Quiz 4
	R	Oct	4	Logic: First Order logic (FOL)	7	
7	T	Oct	8	Logic: Inference in FOL	9.1–4	Quiz 5
	R	Oct	11	Logic: Resolution in FOL	9.5–6	A4 due
8	M	Oct	15	NO CLASS — Monday schedule		
	R	Oct	18	Logic: Logic wrapup		A4–II due; A5 out
9	M	Oct	22	Learning: Introduction; Decision trees	18.1–3	Quiz 6
	R	Oct	25	Learning: Decision trees; PAC learning	18.4–6	
10	M	Oct	29	Learning: Reinforcement learning	17.1–3, 20.1	Quiz 7
	R	Nov	1	Learning: Reinforcement learning	20.2–7	A5 due; A6 out
11	M	Nov	5	Learning: Probability	14	Quiz 8
	R	Nov	8	Learning: Bayesian learning	handouts	
12	M	Nov	12	Learning: Bayesian classifiers	handouts	Quiz 9
	R	Nov	15	Learning: Perceptrons	19.1–3	A6 due
13	M	Nov	19	Learning: Neural networks	19.4–5	Quiz 10; A7 out
	R	Nov	22	Applications: Planning	11	
14	M	Nov	26	Applications: Robotics	25	Quiz 11
	R	Nov	29	NO CLASS — Thanksgiving break		
15	M	Dec	3	Applications: Computer vision	24	Quiz 12
	R	Dec	6	Applications: TBA		A7 due

The readings refer to chapters and sections of our text. Supplemental readings will be handed out in class as necessary.

Tentative assignments

assignment	topic
1	Scheme programming
2	Scheme programming
3	A* search (sliding block puzzles)
4	Game playing search (Connect 4)
5	Logic
6	Learning (decision trees?)
7	Learning (game playing?)