CS 470 – Introduction to Artificial Intelligence Course Syllabus and Calendar – Spring 2002

Instructor: Don Colton

Brigham Young University—Hawaii Campus

1 Preliminary

This is a preliminary version of the syllabus, based on a prior semester. I will make some necessary revisions and issue a final version in a few days. This should get you started.

1.1 The Course

- **Course Number:** CS 470
- **Title:** Introduction to Artificial Intelligence
- **Course Description:** Computers in problem solving, natural language understanding, theorem proving, game playing, robot development, and related areas. (Prereq: CS 312, CS 330.)
- **Textbook:** *Artificial Intelligence, A Modern Approach*, by: Stuart Russell and Peter Norvig
- **Class Time:** MWF 1:00–2:50 PM
- **Classroom:** GCB 153

1.2 The Instructor

- **Instructor (me):** Don Colton
- **My email:** don@cs.byuh.edu
- **My Office:** GCB 130 B
- **T.A.:** none

1.3 Office Hours

My office hours for Spring 2002 are MWF 11–1. Updated office hours are posted outside my office door. Students for whom the posted hours are not convenient can contact me by email to make an appointment.

I also have an open-door policy, posted on my office door as follows: "If my door is open (even just a bit) feel free to knock and come in. – Bro. Colton"

1.4 Special Needs

Brigham Young University–Hawai'i is committed to providing a working and learning atmosphere, which reasonably accommodates qualified persons with disabilities. If you have any disability that may impair your ability to complete this course successfully, please contact the students with Special Need Coordinator, Leilani A'una at 293-3518. Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Human Resource Services at 780-8875.

1.5 Preventing Sexual Harassment

Title IX of the education amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds, including Federal loans and grants. Title IX also covers student-to-student sexual harassment. If you encounter unlawful sexual harassment or gender-based discrimination, please contact the Human Resource Services at 780-8875 (24 hours).

1.6 Subject to Change

It is possible that I will revise some aspects of the course as we go along. Any changes I make are likely to be to your advantage. If any of my changes seems unfair to you, let me know. I will try to correct it.

2 Why Take This Course?

Artificial Intelligence (AI) has been a goal of computer scientists since the earliest days of computing. It has benefited and suffered from overblown expectations. It has had seasons of high respect and great disdain. Every computer scientist needs a basic understanding of AI, including its terminology and its accomplishments.

3 Course Content

In this class we will gain the basic understanding of AI that is needed by every computer scientist. We will write several programs that utilize AI technology. We will cover a good part of the book, and will discuss it and learn the terminology.

The book takes a new view to AI, and one that I think is very good. It views the field as having a goal to build intelligent agents. I think this framework makes it easier to understand what AI really is and is not.

4 Attendance

As far as possible we will work together as a team. Our common goal will be the education of each member of the class. On-time arrival will be rewarded by occasional treats and by our ability to cover more ground together. Please come on time.

If you do not attend, you will become disconnected from the team and from the flow of the material. Your interest is likely to grow cold and your odds of passing the course will be greatly reduced. Also, I become depressed if attendance falls off. (Be kind to me.)

Some days are marked "Review/Test" on the course calendar. On those days we will meet in the normal classroom but attendance is not required. Your taking of the exam (in the testing center) counts for attendance on those days.

Due to INS (immigration) and VA (veterans) requirements the Vice President for Student Life is notified whenever a student misses four consecutive class periods.

5 Lecture Policies

My most important goal is for you to develop intuition about the subject matter, and to get unstuck if you have become stuck. Accordingly, I devote as much time as necessary to the answering of your questions, especially when those questions seem to be of general interest to the others in the class. (Questions of narrow interest may be deferred to my office.) Otherwise, the time is generally spent in discussion of some topic or other that is closely related to the material in the textbook. I may pose a problem to the class, and moderate as we work through it together. This can serve as a jump-start for understanding and mastering new material. My method of teaching is based on the view that learning is a shared activity between the teacher and the student, and that learning proceeds most quickly when interaction occurs.

6 Work Load

In the United States, the expectation for accredited university-level course work is that there be an average of three hours of work per week for every hour of credit awarded. In a lecture class this means one hour in class and two hours outside of class. Since this is a three-credit class and we meet three hours a week, this means six hours of work outside of class per week. It is my goal to keep the work load for an average member of the class at these levels.

I require you to read regularly in the textbook. It is excellent. The authors are highly respected, have a nice presentation style, and they know their material. It is a good book. You will benefit from reading it.

There is an average of 20 pages of reading per class hour (about 560 pages for the course). I figure that should take you about two hours, some days more, some days less. Some of the reading is slow and careful but much of it is story. The course calendar lists by chapter and section the topics that will be discussed. To maximize your understanding, you should read the relevant sections before attending class and then review them again after class. Even if we do not discuss all of a chapter, you are responsible for its contents on the tests and final exam. Skim back through them the day before the exam.

Several programming tasks will be assigned. I have not taught this class before, so I will be experimenting more than usual in my choice of assignments.

Some homework will probably be assigned. Generally reading, programming, and homework together will not exceed three hours per class period. If you find the workload to be heavier than that, please let me know and I will try to back off a bit.

What is the hardest part of the class? I don't know yet, but I suspect it will be the programming.

7 Grading

Grades will be computed on the basis of points earned on reading, homework, quizzes, lab work, and tests. The weighting is as follows:

- **10.0%** reading
- **10.0%** homework and quizzes
- **46.5%** labs
- **43.5%** tests
- **100.0%** total

Reading: The purpose of the reading is to introduce you to a lot of material and vocabulary used in the AI field. From my reading thus far, my experience is that the reading is too verbose, and speed-reading techniques may be appropriate. It probably varies section by section. We will just have to take it as it comes and see what happens.

Each day in class I will ask each student whether they have completed the reading assigned for that day. I add up the yeses and nos to determine the reading component of the final grade, based on a straight-line computation.

Homework: The purpose of homework is to help you master the course material in a low-stress setting where resources such as the textbook can be consulted in a leisurely way. **Homework in this course can be done with the aid of other students, and answers can be compared.**

Late Homework: Late homework is occasionally accepted if your excuse is good enough and I happen to be in a good mood.

Quizzes: The purpose of quizzes is to show me and you how well you are learning on a topic-by-topic basis. Most things on the exams show up on quizzes first.

Quiz Makeup: Quizzes cannot be made up except when I approve it in unusual circumstances (including good excuse and good mood).

Labs: The purpose of labs is to experience programming and grow thereby. Programming can be an extreme joy, where time ceases to exist (e.g., "just a minute" can be several hours, but you don't notice). It can be a great pleasure to cause a machine to obey your will, an inch at a time. Or it can be a nightmare, where nothing seems to work right, and the most insignificant things turn out to have far too much significance, and you pull out great clumps of your hair and hit you head against the wall and want to rush right over to your academic advisor and change majors to something you can actually enjoy instead of this misery. Labs reflect the true reality of computer science life. You should experience them.

All labs will be "open-neighbor" labs in the sense that you can confer with other students and lab assistants. You can show your code to others and look at the code others have written. You can also talk about your code, your approach, your difficulties, and your ideas. You can draw pictures and make analogies and ask me (even me) questions.

Tests: The primary purpose of tests (examinations) is to gauge student learning by measuring performance in a timed and supervised situation. Some memorization may be required.

It is understood that such a situation creates additional stress for many students. For this reason testing is not used exclusively in the grading process. Each test will receive a scaled (normalized) score and a letter grade indicating the final course grade that would be earned by consistent performance at the level reflected on that test.

Testing Center: Except the final exam, most tests are given in the BYUH testing center. The day of the exam we will preview it in class. You can take the exam that same day or the next day. Generally I allow unlimited time but no books or notes.

Test Makeup: Exams cannot be made up except when I approve it in unusual circumstances. This is *very* rare.

Grading Scale: I use the following grading scale, both for individual assignments and for the course as a whole.

93%+	A	90–92.9%	A-	87–89.9%	B+
83–86.9%	B	80–82.9%	B-	77–79.9%	C+
73–76.9%	C	70–72.9%	C-	67–69.9%	D+
63–66.9%	D	60–62.9%	D-	0–59.9%	F

Final Exam: Even though the final exam may count for just a small percentage of your overall grade, you must pass the final exam (60.0% or better) in order to get a C or better in the class.

Other notes: I reserve the right to up-scale the scores on any assignment, exam, or whatever, if I feel the absolute numeric grading is too harsh. The transformation may even be non-linear, but in any case, absolute rank order will be preserved and no score will go down.

I welcome the opportunity to discuss specific instances of grading with you, and to hear your requests for different grades than were initially assigned. In fact, I encourage it. Some very good learning occurs in these settings (for you **and** for me). About half the time I end up agreeing with the request. The best time to do this is during my office hours. As an alternative, you can submit your argument in writing, together with the original graded work.

Final grades are generally issued by email soon after the final exam, or in-person if I feel that some discussion might be beneficial. Students are invited to visit my office to claim any exams or homework that I am still holding, and to discuss their academic progress. Interim progress reports are issued to the students several times during the course, generally after the midterm exams and before the final exam.

8 Office Hours

Office hours are posted outside my office door. Currently they are Daily 1–2. Office hours are subject to change, as I might discover the need to attend some meeting somewhere, or visit the men's room, or talk to someone in the computer lab.

Students for whom the posted hours are not convenient, or who just want a guaranteed appointment, can come by whenever my door is open (which is most of the time) or contact me by email to make an appointment.

My "open-door policy" is posted on my office door as follows: "If my door is open (even just a bit) feel free to knock and come in. – Bro. Colton"

9 Communication by Email

When I want to say something, or when you want to say something, if we are not in the same room, my first choice is to do it by email. I far prefer it to telephone calls, for instance. When there is an announcement, I will generally tell you in class or send it to you by email. Such announcements might include clarifications on the homework assignments.

Programming homework is submitted by email from the student to me, and the grading of such homework is returned by email. You will need to maintain an email account and to provide me with a valid email address.

10 Computer Accounts

You should have a computer account in the Computer Science lab (GCB 101). This account gives you access to UNIX systems, software (including compilers and assemblers), email, web surfing, some storage (currently 10 megabytes to start with), and some paper printing (currently 100 pages per CS class). There are also a few modems for dial-in access. You will use your CS account to do the lab work in this class. See me or a lab worker (GCB 101) to get set up.

11 Subject to Change

It is very unlikely that I will make any major changes, but aside from course number, title, and description, I reserve the right to change anything in this syllabus including the grading policies and the course calendar. Important changes are generally communicated in class and by email to those affected. If my changes are unfair to you, let me know. I will try to fix it.

12 Course Calendar

The course calendar is subject to change by me at any time for any reason. To avoid disruption and unhappiness, I avoid changes (especially exam dates) as much as I can. Any substantial change will be communicated in class and by email.

CS 470 Tentative Course Calendar Spring 2002

mtg	day	date	time	read	Topic	pct
1	Thu	Aug 27	11am		introduction, syllabus, questionnaire	
2	Tue	Sep 1	11am	1	introduction	
3	Thu	Sep 3	11am	2	intelligent agents	
	Mon	Sep 7			Labor Day	
4	Tue	Sep 8	11am		summary: AI	
5	Thu	Sep 10	11am	3	search	
6	Tue	Sep 15	11am	4	informed search	
7	Thu	Sep 17	11am		summary: problem-solving	
8	Tue	Sep 22	11am	6	agents that reason	
9	Thu	Sep 24	11am	7	first-order logic	
10	Tue	Sep 29	11am	9	inference	
11	Thu	Oct 1	11am		summary: knowledge and reasoning	
12	Tue	Oct 6	11am	11	planning	
13	Thu	Oct 8	11am	13	acting	
14	Tue	Oct 13	11am		summary: action	
15	Thu	Oct 15	11am	14	uncertainty	
16	Tue	Oct 20	11am	15	probabilistic reasoning	
17	Thu	Oct 22	11am		summary: uncertainty	
18	Tue	Oct 27	11am	18	observation	
19	Thu	Oct 29	11am	19	neural and belief networks	
20	Tue	Nov 3	11am		summary: learning	
21	Thu	Nov 5	11am	22	communication	
22	Tue	Nov 10	11am	24	perception	
23	Thu	Nov 12	11am		summary: communication	
24	Tue	Nov 17	11am	26	philosophy	
25	Thu	Nov 19	11am	27	the future	
26	Tue	Nov 24	11am		summary: conclusions	
	Thu	Nov 26			Thanksgiving Thursday	
	Fri	Nov 27			Thanksgiving Friday	
27	Tue	Dec 1	11am		Review for Final Exam	
28	Thu	Dec 3	11am	tba	tba/28	
	Thu	Dec 10	7am-10		**Comprehensive Final Exam**	
	Fri	Dec 11	noon		Final Grades by email (I hope)	