
CS 426: Artificial Intelligence (Spring 2010)

Instructor: Djamel Bouchaffra, Associate Professor of Computer Science

Class Time: Tuesday and Thursday from 9:30 to 10:50 am, Room: 136 Carver Hall

Office Hours: 133 Carver Hall
Tuesday and Thursday from 1 pm to 4 pm.
Wednesday from 1 to 3 pm.

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Textbook: D. Poole, A. Mackworth, and R. Goebel, Computational Intelligence: A Logical Approach, Oxford University Press, January 1998 (ISBN 0195102703)

Course Description:

We introduce this course by defining the concept of Computational Intelligence. We first introduce the idea of agents in the world. We then discuss the notion of representation and reasoning system and provide some case studies that illustrate this concept. Different search algorithms such as graph-searching, blind search, heuristic search and constraint satisfaction problems will be covered. We will define the concept of knowledge representation (the core of Artificial Intelligence). We finally cover the uncertain knowledge (using a probability measure), and the learning machine paradigm (learning as choosing the best representation and learning under uncertainty). We conclude the course by applying some of the artificial intelligence concepts in robotic systems.

Link to course materials (slides hand-out, homework assignments, tasks schedule...):

<http://www.djamel-bouchaffra.info>

Objectives:

By the end of the semester, students enrolled in this course should be able to:

- A. Define the concept of computational intelligence and the role of agent in different application domains.
- B. Embed intelligence in the computer. In other words, the student should be familiar with the knowledge representation and reasoning system in order to communicate with the computer.
- C. Cast the problem at hand as a graph searching. Solutions to a problem should be viewed as a set path extracted from a graph.
- D. Represent knowledge using different paradigms.
- E. Understand the interaction of actions, planning with time and distinguish between a “reactive agent” and “temporal agent”.
- F. Program a computer in order to take actions in an uncertain environment.
- G. Build an algorithm that makes computer “learn”.
- H. Illustrate the design of situated robots (agents, robotics systems and robot controllers)

Class Topics Schedule (TENTATIVE!):

Date	Topics	Assignments & Exams
Week 1 (01/19):	Computational Intelligence & Knowledge	
Week 2 (01/26):	Representation & Reasoning System & Using Definite Knowledge (*)	
Week 3 (02/02):	Searching	
Week 4 (02/09):	Representing Knowledge	
Week 5 (02/16):	Mardi Gras Holiday: No Class on Tuesday 02/16 Beyond Definite Knowledge	Homework #1 assigned
Week 6 (02/23):	Beyond Definite Knowledge	Homework #1 due on Thursday 02/25
Week 7 (03/02):	Actions & Planning	Project assigned
Week 8 (03/09):	Actions & Planning	Mid-Term Exam (Thursday 03/11)
Week 9 (03/16):	Assumption-based Reasoning	Homework #2 assigned
Week 10 (03/23):	Using Uncertain knowledge	Homework #2 due on Thursday 03/25
Week 11 (03/30):	Spring Break	
Week 12 (04/06):	Learning	
Week 13 (04/13):		Written report due (Tuesday 04/13) Oral Presentations (Thursday 04/15)
Week 14 (04/20):	Building Situated Robots	Oral Presentations (Tuesday 04/20)
Week 15 (04/27):		Project Presentations (04/27)
Final Exam: Thursday May 6th 2010 from 10:30 to 12:30 am		

(*) Chapter 2 & 3 are presented together as they form a coherent whole. They are separate in the book to keep formalisms & the methodology separate.

Grading:

- Final Exam (20%) (1 page of notes permitted)
- Mid-Term Exam (15%) (1 page of notes permitted)
- Project Assignment (30%)
- Written/Oral Presentation (10%)
- Homework (25%)

Grading Scale:

A: 90-100 **B:** 80-89 **C:** 70-79 **D:** 60-69 **F:** below 60

Plagiarism or cheating on any test or exam results in a course grade of F, and expulsion from the classroom.

Instructions Regarding Assignments

- NO LATE assignments will be accepted. Assignments should be submitted on the date and time due.
- Plagiarized assignments will result in a grade of "F".
- **Project Assignment:**
 - Each student will be assigned a group.
 - The programming task is assigned to the whole group. It should be demonstrated in the class on the due date. The group will have ten minutes to explain briefly the code using a Powerpoint presentation and show some input/output data. Graphical user interfaces are recommended but not a must.
 - A CD containing the Powerpoint presentation as well as the source code and the results should be turned in to the instructor.
- **Written/Oral Reports:**
The reports should be well-written and an electronic version (attached document within an E-mail) should be sent to the instructor one week earlier to the presentation of the work. The students are divided into groups of two. Each student is within the same group chosen in programming assignments. An oral presentation of the report's contents is required. Each student will have 10 minutes of oral presentation.

Policies:

All rules and regulations stipulated in the GSU Student Handbook will apply. In addition:

- Everyone is expected to conduct himself/herself in a mature and responsible manner. No eating or drinking during class. Men should remove hats.
- Class attendance is a privilege and a duty. Everyone is expected to arrive on time and remain for the entire class period. Failure to do so is considered an absence.
- Attendance will be recorded each class period. The attendance record will be routed to the registers office immediately by computer. Be on time since being late is counted as absent. The roll is used by financial aid to determine your qualifications for refunds and/or financial aid.
- It is the responsibility of a student who misses a class to find out what was missed and cover the missed work.
- **CELL PHONES MUST BE TURNED OFF** in the classrooms and faculty offices.
- **NO MAKEUP TESTS WILL BE GIVEN.** A student who knows in advance that he/she will be absent from a test with a University excuse (due to, e.g., band, athletics, or other university-related event) may petition to take the test early. No test is given after the scheduled date. A schedule of

your extracurricular activity and verification (document signed by the sponsor) of your participation must be submitted to me by the close of registration.

- No work for extra credit will be assigned on an individual basis during or after the semester.
- Group discussions and study groups outside the classroom are strongly encouraged.
- Cheating of any kind is a very serious matter and will result in an "F" grade in the course.
- During a test the students will sit in alternate rows. Cell phones must be turned off and put away.
- Do not ask questions during a test. If you find a question ambiguous, you should write a note to that effect and proceed using your best judgment. Student whose first language is not English may ask for clarification of a word or phrase.
- During a test nobody may leave the room and return to work on the test. A student, who arrives after the first completed test has been submitted, will not be able to take the test.

Security of Exams

During exam periods all students will be required to show a valid University ID.

Additional Instructions:

- All tests are given in the assigned classroom. The test content will be representative of all classroom lectures and lab assignments.
- No student is exempt from taking the final examination.
- Please inform the instructor as early as possible if you are a graduating senior.
- Students participating in University sponsored extra curricula activities, e.g., band, football, track. etc., should submit a signed verification from the activity's director by the end of the third week of classes. Written notification of a scheduled event that conflicts with a test date should be given to the instructor at least a week before the test date so that the test can be rescheduled. The rescheduled test should be taken prior to the scheduled date or no later than three days after that date.

Computer Laboratories:

You are at risk of forfeiting, your account's use (either temporarily or permanently) if you violate any of the following:

- NO eating or drinking in any computer labs. Drink and food containers are not to be used into the laboratory.
- Cell phones must NOT be used in lab. Turn sound off or put in vibrate mode. Exit the lab your cell phone.
- Use earphones for audio output. Audio mode should not be used without earphones.
- No loud talking/group discussions in labs. Use vacant classrooms for group or team discussions.
- DO NOT allow anyone to use your password to access your computer account.
- DO NOT sit on desk or tabletops. Use the chairs for seating'
- Place backpacks and other storage/packaging items on the floor near your workstation.

Computer Accounts

Each student will be assigned a computer account, which is valid for one semester. During the semester you will be able to save your files on the department file server. You may want to purchase a 3 1/2" double-sided, high-density diskette, onto which you can copy your files at the end of the semester, as the files on the server will be deleted before the beginning of the next semester.

The students in CS 426 should use the lab in Carver Hall 277 for their assignments. You may also use the computers in Carver Hall 133. If you have a Java compiler at home, please let the instructor know that you wish to do your assignment on your own computer; you are still required to attend the lab sections to learn to use the computers in the lab.

Lab rules must be obeyed!

Resolution of Concerns or Problems

If you have any concerns or problems regarding any aspect of this course, please discuss it first with the instructor and then, if necessary, with the department head.

Disabilities Statement

If you need accommodation in this class/setting/facility related to a disability, please inform the instructor of the course as soon as possible.