

CSCE 475H Multiagent Systems

Class Syllabus

Spring 2015

Instructor

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Class Objectives

This class will introduce you to the research topic of multiagent systems (MAS), including what a MAS is, what agents are, and what are the disadvantages and advantages of such a system in different types of applications. We will present some background issues in distributed problem solving (e.g., constraint satisfaction) and planning (e.g., optimization) and build on the non-cooperative game theory. Then, equipped with the background knowledge, we will look into learning in multiagent systems and agent communication. Then we will cover formal agent topics such as social choice, mechanism design, auctions, and coalitional game theory. In terms of applications, we will also look into multiagent negotiations, emergent behaviors (such as ants and swarms), and Robocup technologies. Time permitting, we will also look into research in real-time coalition formation.

The course materials in this class are based on the textbook and journal/conference papers.

Required Background

Prerequisites: CSCE 310 (Data Structures & Algorithms required), or instructor permission.

Text Book

Shoham, Y. and K. Leyton-Brown (2011). *Multiagent Systems: Algorithmic, Game-Theoretic, and Logical Foundations*, Cambridge University Press.

Grading

Final grades in this class will be assigned based on the following scale:

A:	94% - 100%	B-:	80% - 82%	D+:	67% - 69%
A-:	90% - 93%	C+:	77% - 79%	D:	63% - 66%
B+:	87% - 89%	C:	73% - 76%	D-:	60% - 62%
B:	83% - 86%	C-:	70% - 72%	F:	below 60%

A+ is awarded to a student whose work and understanding of the class prove to be exceptional.

There will be about 5-10 collaborative topic summaries (15%), several game days (group) (25%), one mid-term examination (20%), one seminar presentation (group) (10%), and one final project (group) (30%).

Collaborative Topic Summaries

Collaborative topic summaries are written summaries—in Wiki form—of topics that we cover in class. Specific requirements will be given before each summary assignment. The students will be divided into several groups and each group will collaborate to prepare one final version of the topic summary. Further details will be provided prior to the first assignment.

Educational Study. A formal study will be conducted to evaluate the impact of collaborative writing and Wiki group formation techniques on student learning. Your decision to participate (or not participate) in this study will not impact your grades in the class. You will be asked to sign a consent form for us to use the data tracked using Wiki in this study.

Seminars

The seminar presentation is for the students to present technical papers (or advanced chapters and sections from the textbook) in the area of MAS, agents, and distributed AI. A list of papers will be provided to the students. Each presentation will involve a Q&A session paneled by the presenters and moderated by the instructor; and all groups are required to participate in Q&A as well. One thing unique about our seminars is that students will be graded for their participation in the Q&A sessions – as panelist on the day of their presentation, and as scholars asking questions on other presentation days. Details of the grading criteria will be provided on the assignment handout later.

Final Project

The final project will be for a multiagent simulation that aims to address an important MAS problem such as how local decisions made by a large group of agents (greater than 500) can lead to meaningful emergent behaviors that satisfy global goals or the ad hoc team playing challenge problem. The simulation software that we will use is Repast. See the Resources page on our course website for the software. This assignment will be graded in 2 parts: programming (50%) and report (50%). Each group member receives the same score for his or her group. Details of the grading criteria will be provided on the assignment handout later. One unique requirement is that the project requires each group to conduct experiments and write a comprehensive discussion of results based on the POJI¹ style. Each group will be required to submit a proposal, a progress report, and a final project report.

Game Days

There will be 3-4 special game days planned for the semester, e.g., Auction Day, Voting Day, Learning Day, and Reputation Day. On each of these days, you will be required to pit what you have learned in the class against your classmates in various contests. Your participation on those days will be evaluated. Your written reports for those days will be counted as participation as well. Each game day will be graded in 2 parts: contest (50%) and report (50%).

¹ This is the term coined by Professor Soh for Presentation, Observation, Justification, and Implication. We will discuss this in class.

Each group member receives the same score for his or her group. We will also have a Game Days League – the winner of the league will get to sign the “Ball of Fame”.

The contest part will be graded in proportion to how your group ranks at the end of the game day. For example, the winning team will be given N points; the second-ranked team will be given N-2 points; the third-ranked team will be given N-4 points; and so on. N will be determined later in the semester depending on the number of groups we have in the class.

The report part will be graded roughly in the following manner:

40% Pre-game strategies

30% During-game observations and changes in strategies

30% Post-game strategies and lessons learned

Disabilities

Students with disabilities are encouraged to contact Christy Horn for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Research Study

UNL has received federal funding to continue the design and Implementation of Creative Competency Exercises designed to improve computational and creative thinking in courses at the University of Nebraska. This semester evaluation will be done in the class to help understand how doing these exercises impacts student learning and student attitudes and motivation for science, engineering, technology and math courses. Faculty from CSE and Educational Psychology will be coming to class or lab to proctor surveys that will aid in this evaluation. You will be getting more information from them during the first or second week of the semester. Thank you in advance for your help with this important project.

Academic Misconduct

Violations of academic integrity will result in automatic failure of the class and referral to the proper university officials. The work a student submits in a class is expected to be the student's own work and must be work completed for that particular class and assignment. Students wishing to build on an old project or work on a similar topic in two classes must discuss this with both professors. Academic dishonesty includes: handling in another's work or part of another's work as your own, turning in one of your old papers for a current class, or turning in the same or similar paper for two different classes. Using notes or other study aids or otherwise obtaining another's answers for an examination also represents a breach of academic integrity. Sanctions are applied whether the violation was intentional or not.

Academic dishonesty of any kind will be dealt with in a manner consistent with the CS&E Department's Policy on Academic Integrity

(http://cse.unl.edu/undergrads/academic_integrity.php). You are expected to know and abide by this policy.

Those who share their code and those who copy other's code will be penalized in the same way; both parties will be considered to have plagiarized.

To help avoid these problems, please start assignments early and seek help when you need it.

PLAGIARISM OF ANY KIND IN THIS COURSE WILL RESULT IN A GRADE OF F.