

**C S 4013/5013: Artificial Intelligence**  
**Spring 2022**  
**University of Oklahoma**

**Course general information:**

**Location:** Sarkeys Energy Center, Room N202

**Lecture time:** MWF 12:30 PM -1:20 PM CST

Midterm exams: 2/25 and 3/25 12:30-1:25 PM, in the class

**Final Exam: 5/11/2021**

**Course website:** Canvas

**Course Materials:** all the materials will be posted on Canvas

**Course Announcement and discussions:** canvas and course email

**Course HW/project discussion and exam preparation sessions:** TBD

**Course Staff:**

Golnaz Habibi (Instructor): lectures and course materials

[golnaz@ou.edu](mailto:golnaz@ou.edu)

Office hours: Tuesdays and Thursdays 11-12, DEH 435

Brandon Morgan (GTA): projects

[morganscottbrandon@ou.edu](mailto:morganscottbrandon@ou.edu)

Tentative Office hours (project discussion):

M 9:30-11:30, Tue, Thurs: 9:00-11:00, Weds 1:30-3:30

Room DEH 115

Ethan Womack (UTA): homework

[thancwomack@ou.edu](mailto:thancwomack@ou.edu)

Office hours: Wednesdays 3:30-5:30

**Course Description:**

This course introduces fundamental knowledge for designing an intelligent and autonomous agent who lives in an environment with fully observable or partially observable settings and with/without adversarial agents and the agent needs to make decision to reach its goal or accomplish its mission (e.g., maximize its score). Each autonomous system has three main modules of perception, planning, and control, The focus of the course is topics on planning/decision making as well as agent's perception (learning based methods and statistical methods). The course also introduces basics topics on computer vision, self-driving cars and game theory.

## Course Summary:

Topics covered in this course:

- Search techniques for an intelligent agent with and without adversary agent (e.g., A\*, DFS, BFS, UCS, UCP)
- Decision making and planning in fully observable and partially observable environments (MDP, POMDP)
- Machine learning basics focus on Logistic regression and Naïve Bayes, statistical learning and HMM
- Particle Filtering
- Convolutional Neural Networks: basics and applications
- Introduction to other Deep Learning Models: Autoencoders
- Imitation learning and Reinforcement Learning
- AI for self-driving cars
- AI for Games
- AI for computer vision

## Course Objective:

At the end of the semester, student learns...

- how to design an agent with the ability of searching in a maze environment with and without adversarial opponent.
- basics on decision making under uncertainty and reinforcement learning
- state estimate using particle filtering
- how to classify the handwritten numbers and detect the objects in an image by using machine learning techniques.
- how to apply basic AI to different problems in planning and perception

## Course Prerequisites:

(CS2413 or CS 5005) and (CS 2813 or CS 4005 or MATH 2513)

**All the projects are in Python. The students are expected to have skill and experience in Python programming**

## Textbook (required):

Reading assignments refer to AIMA, 4<sup>th</sup> edition unless otherwise specified.

## Projects:

The course has five main projects (+ project 0 as warmup) based on Python programming. There would be extra project (one paper review) for student of section CS5013. Except project 0 which must be done individually, you can work on projects in groups of 1-2. The Deadline to finalize your group is **January 28 at 2PM**.

Note that if you decide to do you project individually, your grading would not be easier and no exception for that. Students can discuss in groups, but they **SHOULD NOT COPY** the codes from each other unless they are in the same group. All the students are required to submit the project individually even if they are working in a team, specifying the name of the team members.

The course staff provide the guideline for each project which is posted in Canvas.

**Homework:**

This course has eight homework which should be submitted individually.

**Late policy for the homework and projects:**

There are the total of five grace days that you can use for your homework and projects (up 2 days for each HW/project). After that your grade is penalized by 20% for every day late.

The homework with lowest grade is dropped.

**Communication:**

Students are encouraged to pose their questions in discussion sections so it may be helpful for other students as well. For any questions regarding the course (HW, projects, grading, material, etc) you can reach out the course staff via email or canvas or during office hours.

**Course Evaluation:**

Midterms Exam : 25%

Projects: 30%

Homework: 20%

Final Exam: 25%

**Score-grade conversion:**

Score	Grade
$\geq 90$	A
80-89	B
70-79	C
60-69	D
$< 60$	F

**OU's academic integrity:**

Copying another's work for homework and project assignments, or possession of unauthorized electronic computing or communication devices in the testing area, is the course violation and grounds for penalties in accordance with school policies.

Please see [OU's academic integrity website](#).

**Accommodations:**

Any student with a disability should contact the instructor so that reasonable accommodations may be made for that student.

**Adjustments for Pregnancy/Childbirth Related Issues:**

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me as soon as possible to discuss. Generally, modifications will be made where medically necessary and similar in scope to accommodations based on temporary disability.

Please see <http://www.ou.edu/eoo/faqs/pregnancy-faqs.html> for commonly asked questions.

**Title IX Resources**

For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on-call 24.7, counseling services, mutual no contact orders, scheduling adjustments and disciplinary sanctions against the perpetrator. Please contact the Sexual Misconduct Office 405-325-2215 (8-5) or the Sexual Assault Response Team 405-615-0013 (24.7) to learn more or to report an incident.

**Holidays:**

It is the policy of the University to excuse the absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required class work that may fall on religious holidays.

**Related Documents:**

Students should also read the related documents on [Replacement Assignments or Extensions](#) and [Discussions of Scores and Grades](#).

**Foods and drinks in the class:**

Food and drink are not permitted in the classroom or lab, with the exception of covered water bottles, which may be used sparingly in these locations and the cap immediately returned to the bottle after each drink.

**Laptop in the class:**

Using laptops in the class is discouraged as it could distract the owner and other students. But if you need to use your laptop during the lecture, please seat at the last row to minimize distracting others.

**Mask policy:**

For the first two weeks of the semester (through January 31) masking will be required in classroom settings. Beginning February 1, 2022, the Norman campus will revert to the Fall 2021 masking guidance, which is listed below, and encourages masking in the classroom and requires masking for a two-week quarantine period when a confirmed positive COVID-19 case in the class is identified.

As has been our policy since the start of Fall 2021, masking will continue to be expected in all indoor settings for all faculty, staff, and students. While cloth masks are still permissible, the university strongly recommends the use of KN95 masks or disposable surgical masks as

they provide far greater amounts of protection against Omicron. KN95 and disposable surgical masks will be made available to OU community members. Campus Safety will provide masks to building supervisors to be made available at all entrances.

To the extent possible, in-person meetings should be replaced with virtual meetings (e.g., Zoom, Teams) or conference calls. When in-person meetings are necessary, masks are expected, and social distancing is recommended. **Please check the OU Covid-19 regularly to get updated. If you have any concern regarding wearing the mask in the class, please contact the instructor**

## Emergency Protocol

During an emergency, there are official university procedures that will maximize your safety.

- **Severe Weather:** If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather 1. LOOK for severe weather refuge location maps located inside most OU buildings near the entrances 2. SEEK refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building. 3. GO to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows. 4. GET IN, GET DOWN, COVER UP. 5. WAIT for official notice to resume normal activities.

Links: [Severe Weather Refuge Areas](#), [Severe Weather Preparedness](#)

- **Armed Subject/Campus Intruder:** If you receive an OU Alert to shelter-in-place due to an active shooter or armed intruder situation or you hear what you perceive to be gunshots: 1. GET OUT: If you believe you can get out of the area WITHOUT encountering the armed individual, move quickly towards the nearest building exit, move away from the building, and call 911. 2. HIDE OUT: If you cannot flee, move to an area that can be locked or barricaded, turn off lights, silence devices, spread out, and formulate a plan of attack if the shooter enters the room. 3. TAKE OUT: As a last resort fight to defend yourself.

Links: [OU Emergency Preparedness](#), [Responding to Gunshots](#)

- **Fire Alarm/General Emergency:** If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates: 1. LEAVE the building. Do not use the elevators. 2. KNOW at least two building exits 3. ASSIST those that may need help 4. PROCEED to the emergency assembly area 5. ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues. 6. WAIT for official notice before attempting to re-enter the building.

Links: [OU Fire Safety on Campus](#)