San Jose State University
Department of Computer Science
CS 256, Topics in Artificial Intelligence
Spring 2025

Course and Contact information:

Instructor Name: Maryam Khazaei Pool

Email: mkhazaeipool@ucmerced.edu

Office hours: Fridays: 10 a.m. – 11 a.m. – Duncan Hall, room 439

Class Days/Times/Location:

Section 3: Mondays / Wednesdays 4:30 PM - 5:45 PM - MacQuarrie Hall 223

Class Format: In-person

Prerequisites:

CS 156 (Introduction to AI) and Graduate standing. Allowed Declared Major: Computer Science, Bioinformatics, Data Science.

Course Description:

This course provides a comprehensive introduction to the field of Artificial Intelligence (AI). Students will explore fundamental concepts, algorithms, and techniques underlying intelligent systems. The course covers a wide range of topics, including search algorithms, knowledge representation, probabilistic reasoning, machine learning, reinforcement learning, and robotics. Students will gain hands-on experience through programming assignments and develop critical thinking and problem-solving skills. The course emphasizes both theoretical foundations and practical applications of AI.

Textbooks and Other Required Materials:

- Russell and Norvig. Artificial Intelligence: A Modern Approach (Fourth Edition)
- Recent Papers in AI/ML for presentation

Course Objectives / Student Learning Outcomes:

This course aims to equip students with a solid foundation in artificial intelligence. By exploring fundamental concepts, algorithms, and advanced topics such as machine learning, robotics, and probabilistic reasoning, students will develop the ability to apply AI knowledge to real-world challenges. The course emphasizes hands-on learning to foster critical thinking and problem-solving skills essential for success in the field. In this course, participants will gain a comprehensive understanding of artificial intelligence (AI) through a series of focused topics. They will learn about the foundations of AI, including its history and key concepts. Participants will explore intelligent agents, their rational behavior, and the structure of agent-environment interactions. Additionally, they will learn search algorithms, both uninformed and informed, and apply them effectively. The course covers local search techniques, optimization, and planning algorithms, emphasizing classical planning algorithms and heuristics. Participants will also study probabilistic reasoning, Bayesian networks, and machine learning techniques such as reinforcement learning and model-based learning. By the end of the course, participants will be able to design intelligent agents, apply search and constraint satisfaction techniques, reason under uncertainty, build machine learning models, understand robotic systems, and implement planning algorithms.

Project/Assignments/Discussions Description:

Presentation: Students will conduct a state-of-the-art literature review on a specific topic related to artificial intelligence (AI). This project involves reading and summarizing recent research papers, identifying key trends, and understanding the current landscape of AI in the chosen area. Each student will select a topic from a predefined list or propose their own topic (subject to approval). The goal is to explore recent advancements, challenges, and open questions in AI research. As part of this project, students will prepare a written report and deliver a presentation to the class. The presentation should highlight the main findings, critical insights, and potential implications of the reviewed papers.

Homework Assignments: Homework assignments will consist of both programming and non-programming exercises. Problems will be selected from the textbook to reinforce key concepts and skills introduced in class. These assignments are designed to deepen students' understanding of the course material and to prepare them for more complex challenges.

Class Discussions: To foster critical thinking and engagement, class time will include opportunities for discussion. During lecture, students will be presented with thought-provoking questions related to the day's material. These discussions aim to solidify understanding of key concepts and to encourage students to apply their knowledge in different contexts.

Midterm/Final Exam Schedule:

This schedule is subject to change, but is tentatively set as follows:

- Midterm: 3/3/2025
- Project proposal due and presentations: April 16-23
- Final Exams: Section 3: **Tuesday, May 20, 3:15-5:15 PM**, MacQuarrie Hall 223

Grading Policy:

- Homework (programing & non-programming): 25%
- Presentation: 15%
- Participation / quiz: 5%
- Midterm: 25%
- Final Exam: 30%

Letter grades will be assigned according to the following policy:

A: 93 - 100
A-: 90 - 92
B+: 87 - 89
B: 83 - 86
B-: 80 - 82
C+: 77 - 79
C: 73 - 76
C-: 70 - 72
D+: 67 - 69
D: 63 - 66
D-: 60 - 62
F : 0 - 59

Academic Dishonesty Statement:

University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to ensure maximum benefit for all members of the class. Attendance shall not be used as a criterion for grading. However, attendance will be required in order to complete and submit in-class exercises, quizzes, and exams.

It is the aim of the faculty of SJSU to foster a spirit of complete honesty and a high standard of integrity. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic coursework. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The attempt of students to present as their own any work that they have not honestly performed will be considered a violation. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam and may lead to failure of the course and University disciplinary action.

Disability Accommodations:

If you require course adaptations or accommodations due to a disability, or if you need special arrangements in case of building evacuation, please schedule an appointment with me as soon as possible or visit me during office hours. Presidential Directive 97-03 mandates that students with disabilities register with the AEC to establish a record of their disability. Although students are not legally required to disclose the nature of their disability to faculty, they need to disclose their AEC registration if they will be utilizing course accommodations. Students are responsible for providing documentation that supports their learning disability diagnosis and justifies requested accommodations. If you have any specific questions or need further assistance, feel free to reach out to the AEC staff at aec-info@sjsu.edu or call (408)924-6000 during regular business hours.

Classroom Heat Advisory Protocol:

In the event of a heat advisory impacting the Science building (such as SCI 311), this class may be transitioned to a remote format to ensure student comfort and safety. If a heat event occurs, you will be notified in advance regarding any changes to the class format or location. Please check your email and course announcements for updates.

CS 256, Fall 2024, Topics in Artificial Intelligence
Course Schedule (Subject to change with fair notice, which will be posted in Canvas)

Week	Date	Topics
1	M 1/27	Introduction: syllabus, Course Logistics
1	W 1/29	Introduction to AI

2	M 2/3	Intelligent Agents
2	W 2/5	Search algorithm/Strategies
3	M 2/10	Search algorithm/Strategies
3	W 2/12	Adversarial Search and Games
4	M 2/17	Adversarial Search and Games
4	W 2/19	Review
5	M 2/24 and W 2/26	No class due to conference travel
6	M 3/3	Midterm 1
6	W 3/5	Logic
7	M 3/10	Logic
7	W 3/12	Quantifying Uncertainty
8	M 3/17	Quantifying Uncertainty
8	W 3/19	Probabilistic Reasoning
9	M 3/24	Probabilistic Reasoning
9	W 3/26	Machine Learning
10	M 3/31 and W 4/2	Spring break
11	M 4/7	Machine Learning
11	W 4/9	Reinforcement Learning
12	M 4/14	Reinforcement Learning
12	W 4/16	Final presentation week
13	M 4/21	Final presentation week
13	W 4/23	Final presentation week
14	M 4/28	Robotics
14	W 4/30	Robotics
15	M 5/5	Robotics
15	W 5/7	Review for Final
16	M 5/12	Review for Final
Final Exam	M 5/14	Section 3: **Tuesday, May 20, 3:15-5:15 PM**, MacQuarrie Hall 223