

San José State University
Department of Computer Science
CS 156, Introduction to Artificial Intelligence, Section 2, Fall 2022

Course and Contact Information

Instructor:	Rula Khayrallah
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Office Hours:	Online via Zoom: Tuesday 1:30-2:30 PM, Wednesday 4-5 PM
Class Days/Time:	Tuesday/Thursday 3:00-4:15PM
Classroom:	MH 222
Prerequisites:	CS 146 with a grade of C- or better

Course Description

Basic concepts and techniques of artificial intelligence: problem solving, search, deduction, intelligent agents, knowledge representation. Topics chosen from logic programming, game playing, planning, machine learning, natural language, neural nets, robotics.

Course Format

Class time will be spent in interactive lecture. You are required to bring your wireless laptop to class. Your laptop must remain closed except for designated activities. We'll use iClicker to gather your feedback and check understanding during the lecture. iClicker helps me understand what you know, gives everyone a chance to participate, and allows you to review the material after class. You must be in the classroom to participate in the iClicker activity.

Canvas Course Site

Course materials such as syllabus, lecture notes, assignments and exams can be found on the [Canvas Learning Management System course website](http://sjsu.instructure.com) at <http://sjsu.instructure.com>. You are responsible for regularly checking with Canvas to learn of any updates.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. By code or by hand find solution nodes in a state space using the A* algorithm.
2. Explain the advantages and disadvantages of breadth-first search compared to depth-first search.
3. Explain the advantages and disadvantages of informed search, compared to uninformed search.
4. Explain the advantages and disadvantages of hill climbing.
5. Explain the advantages and disadvantages of forward checking in constraint satisfaction.
6. Explain the advantages and disadvantages of alpha-beta pruning.
7. By code or by hand translate sentences in first-order logic to conjunctive normal form (CNF).
8. By code or by hand find proofs by using resolution.

9. Explain the advantages and disadvantages of the PDDL/STRIPS representation for planning.
10. Describe the frame problem.
11. Describe or implement at least one learning algorithm.

Recommended Textbook

Artificial Intelligence: A Modern Approach. 4th Edition. Stuart Russell and Peter Norvig
ISBN: 978-0134610993

Software

Python 3
PyCharm Professional or Community Edition - recommended IDE

Course Requirements and Assignments

Homework Assignments

Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time. A detailed grading rubric is provided for all programming assignments. Please make sure you read and follow the grading rubric to ensure full credit.

Some assignments will be individual work. Others will be team assignments. I will make it clear whether the assignment is an individual assignment or a team assignment.

All work submitted on individual assignments must be your own. You may not share or copy code or answers from fellow students or from the web. Infractions will be detected and will lead to an automatic 0. If someone else copies your work, with or without your permission, you will be held responsible.

For team assignments, teams will consist of two students. The work must be done by both team members and both team members will receive the same grade. Teams may not share or copy code from other teams or from the web. Both team members will receive a zero if that happens regardless of who copied or shared the work. Both team members will also be reported to the Student Conduct and Ethical Development office.

Questions of the Week

We will have a single question every week to check your understanding of the previous week's material. I will count the 10 best scores out of the 13 total questions in the semester. You must be in the classroom and must use the LockDown browser to access and answer the question on Canvas. Missed questions cannot be made up.

Mistern Exam

The midterm exam will take place in the classroom, on Canvas, during class time on Thursday October 13.

Final Exam

The final exam is scheduled according to the SJSU Final Exam Schedule, on Friday December 9, 2:45-5:00 PM.

Academic Dishonesty

Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed. Since active participation is essential to ensure maximum benefit, we'll use iClicker to give everyone a chance to participate. The iClicker participation points may be used to give your final grade in the course a slight boost.

Workload

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Grading Information

Determination of Grades

The final grade in the course will be calculated based on the following percentages:

Homework Assignments: 30%

Questions of the Week: 10%

Midterm: 30%

Final Exam: 30%

The iClicker participation points may be used to give your final grade a slight boost. Students with the highest scores will get up to 1 bonus point. Students who violate the academic integrity policy are not eligible. No other extra credit options will be given.

Late Work

Late assignments will be accepted with a 1-point penalty for each day or partial day late. Late days include weekend days. For example, an assignment due on Tuesday by 5 PM will incur a penalty of 1 point if submitted at 8 AM on Wednesday. Everyone gets two free 'late days' for the semester. No submissions will be accepted more than 2 days late.

Grade Scale

The letter grade will be determined based on the following scale:

<i>Grade</i>	<i>Percentage</i>
<i>A plus</i>	<i>98 to 100%</i>
<i>A</i>	<i>93 to 97%</i>
<i>A minus</i>	<i>90 to 92%</i>
<i>B plus</i>	<i>87 to 89 %</i>
<i>B</i>	<i>83 to 86%</i>
<i>B minus</i>	<i>80 to 82%</i>
<i>C plus</i>	<i>77 to 79%</i>
<i>C</i>	<i>73 to 76%</i>
<i>C minus</i>	<i>70 to 72%</i>
<i>D</i>	<i>60 to 69%</i>
<i>F</i>	<i>below 60</i>

Classroom Protocol

Regular attendance is an integral part of the learning process. Please arrive to class on time and make sure your cell phones are silent during the lecture. Your laptop must remain closed except for designated activities.

COVID-19 and Monkeypox Safety

Students registered for a College of Science (CoS) class with an in-person component should view the [CoS COVID-19 and Monkeypox Training](#) slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the [SJSU Health Advisories](#) website. By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

Students are not allowed to record without instructor permission

Students are prohibited from recording class activities, distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](#) at <http://www.sjsu.edu/gup/syllabusinfo/> . Make sure to review these policies and resources.

CS 156 Introduction to Artificial Intelligence, Fall 2022, Course Schedule

Please note that this schedule is subject to change with fair notice. Any changes will be announced in class and posted on the Canvas course site.

Tentative Course Schedule

Week	Date	Topics	Readings AIMA	QoW	Homework
1	Aug 23	Course Logistics			HW 1 due Aug 30
1	Aug 25	What is AI?	Chapter 1		
2	Aug 30	Intelligent Agents	Chapter 2		
2	Sep 1	Python Essentials			HW 2 due Sep 13
3	Sep 6	Python Essentials		Q1	
3	Sep 8	Problem Solving and Search	Sec 3.1-3.3		
4	Sep 13	Uninformed Search	Sec 3.4	Q2	HW 3 due Sep 20
4	Sep 15	Informed Search: greedy, A* search	Sec 3.5		
5	Sep 20	Heuristics	Sec 3.6	Q3	HW 4 due Sep 27
5	Sep 22	Local Search	Sec 4.1		
6	Sep 27	Constraint Satisfaction Problems	Chapter 6	Q4	HW 5 due Oct 4
6	Sep 29	Constraint Satisfaction Problems			
7	Oct 4	Adversarial Search	Chapter 5	Q5	HW 6 due Oct 11
7	Oct 6	Resource Limits, Expectimax			
8	Oct 11	Review		Q6	
8	Oct 13	Midterm			
9	Oct 18	Logical Agents	Chapter 7		
9	Oct 20	First-Order Logic	Chapter 8		
10	Oct 25	Resolution in First-Order Logic	Sec 9.5	Q7	HW 7 due Nov 1
10	Oct 27	Automated Planning	Chapter 11		
11	Nov 1	Uncertainty	Chapter 12	Q8	HW 8 due Nov 8
11	Nov 3	Bayes Nets Representation	Sec 13.1-13.3		
12	Nov 8	Probabilistic Reasoning Over Time	Sec 14.1-14.2	Q9	
12	Nov 10	Machine Learning	Sec 19.1-19.2		
13	Nov 15	Naïve Bayes Classification	Sec 20.1-20.2	Q10	
13	Nov 17	Perceptron, Neural Nets	Sec 21.1-21.2		HW 9 due Nov 29
14	Nov 22	Nearest Neighbors, Unsupervised Learning	Sec 19.7	Q11	
14	Nov 24	Thanksgiving – no class			
15	Nov 29	The Ethics of AI		Q12	
15	Dec 1	Applications			
16	Dec 6	Review		Q13	
Final	Dec 9	2:45-5:00 PM			