SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

# Introduction to Artificial Intelligence

## CS 156

Summer 2026 Section 01 In Person 3 Unit(s) 06/01/2026 to 08/07/2026 Modified 05/23/2026

## Contact Information

### Instructor: Dr. Amith Kamath Belman

**Email:** amith.kamathbelman@sjsu.edu
**Office:** MH 411

Office Hours: Thu, 1:30 PM to 3:30 PM , on Zoom: https://sjsu.zoom.us/j/86464231325

## Course Information

### Instructor: Dr. Amith Kamath Belman

Tuesday, Thursday, 11:00 AM to 1:00 PM, MH 422

## Course Description and Requisites

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.

**Prerequisite(s):** CS 146 (with a grade of "C-" or better); Allowed Majors: Computer Science, Data Science, Computer Science and Linguistics, Applied and Computational Mathematics or Software Engineering; or instructor consent.
**Grading:** Letter Graded

Cross-listed with SE 156. Computer Science is responsible for scheduling.

## Classroom Protocols

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.

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.

### Recording and Privacy

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

## Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

## Course Goals

To give students a broad understanding of the basic principles and techniques in use today for building "intelligent" software systems. Understand fundamentals of AI and machine learning. Concentration will be on how-to and also the mathematical foundations of AI. This class has a balance between the theory and practical demonstrations of how to solve AI tasks in python and AI applications in various fields.

## Course Learning Outcomes (CLOs)

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 and implement at least one learning algorithm.

# Course Materials

## Artificial Intelligence: A Modern Approach

**Author:** Stuart Russell and Peter Norvig
**Publisher:** Pearson
**Edition:** 4th
**ISBN:** 978-0134610993
**Optional**

## Software

Python 3

PyCharm Professional or Community Edition - recommended IDE

# Course Requirements and Assignments

## Homework

Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time.

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. All students involved in academic integrity violations will be held responsible.

Use of AI is not permitted, unless clearly stated and permitted by the instructor, for each assignment question. If a question requires AI assistant usage in any capacity, the instructor will specify it. All other cases of usage will be considered academic integrity violations.

## Questions of the Week (QOW)

We will have a single question every week to check your understanding of the previous week's material. I will count the 8 best scores out of the 9 total QOWs in the semester. You must be in the classroom and must use the LockDown browser to access and answer the question on Canvas.

Missed QOWs cannot be made up.

## Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed.

## Midterm Exam

The midterm exam will take place in the classroom during class time on July 2nd.

## Final Exam

The final exam is scheduled during class time on August 6th.

# ✓ Grading Information

The final grade in the course will be calculated based on the homework assignments, questions of the week, midterm and final exam.

Makeup exams, QOWs will only be given in cases of illness (documented by a physician) or in documentable, extreme emergency cases.

No other extra credit options will be given.

# Late Work

No submissions will be accepted more than 1 day late.

Late assignments will be evaluated with a 25% penalty. Late days include weekend days.

For example,  Assignment due on Tuesday by 5 PM:

- will incur a penalty of 25% if submitted anytime between 5:01 PM on Tuesday to 5:00PM on Wednesday.
- will not be graded if submitted after 5:01PM on Wednesday.

Everyone gets two free 'late days' for the semester, separately. Cannot be used on the same assignment. Any assignment submitted after 1 day late is not graded. The two free late days, are only used to refund the 25% penalty that was applied to a late submission, not to extend the deadline or the late day.

# 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.

## Criteria

| Type | Weight | Topic | Notes |
|---|---|---|---|
| Homework Assignments | 25% | | |
| Questions of the week | 15% | | |
| Midterm Exam | 30% | | |

| Type | Weight | Topic | Notes |
|---|---|---|---|
| Final Exam | 30% | | |

## Breakdown

| Grade | Range | Notes |
|---|---|---|
| A + | 98 to 100% | |
| A | 93 to 97.99% | |
| A - | 90 to 92.99% | |
| B + | 87 to 89.99% | |
| B | 83 to 86.99% | |
| B - | 80 to 82.99% | |
| C + | 77 to 79.99% | |
| C | 73 to 76.99% | |
| C - | 70 to 72.99% | |
| D | 60 to 69.99% | |
| F | below 60% | |

# University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

# Course Schedule

Tentative Course Schedule.

NOTE: The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

| Week | Dates | Topics | Reading | Exams, QOW, Assignments |
|---|---|---|---|---|
| **Week 1** | Jun 2, 4 | Course Logistics, What is AI?, Intelligent Agents, Python Essentials, Problem Solving and Search | AIMA Chapter 1, 2, 3.1-3.3 | **Jun 2:** Pre-course Survey, Take-home syllabus quiz.<br>**Jun 4:** HW1 (Due Jun 11) |
| **Week 2** | Jun 9, 11 | Uninformed Search, Informed Search (greedy, A*), Heuristics, Local Search | AIMA Chapter 3.4-3.6, 4.1 | **Jun 9:** QOW 1<br>**Jun 11:** HW2 (Due Jun 18) |
| **Week 3** | Jun 16, 18 | Constraint Satisfaction Problems | AIMA Chapter 6 | **Jun 16:** QOW 2<br>HW3 (Due Jun 22) |
| **Week 4** | Jun 23, 25 | Adversarial Search, Logical Agents, First order and Propositional Logic | AIMA Chapter 5, 7,8 | **Jun 23:** QOW 3<br>HW4 (Due Jun 29) |
| **Week 5** | Jun 30, Jul 2 | Logical Agents, First order and Propositional Logic, Automated Planning,<br>Review<br>**Midterm Exam** | 9.5, 11 | **Jun 30:** QOW 4<br><br>**July2nd:Midterm** |
| **Week 6** | Jul 7, 9 | Uncertainty and Bayes Nets Representation, Machine Learning, Naive Bayes | AIMA Chapter 12, 19.1-19.2, 20.1-20.2 | **Jul 7:** QOW 5<br>HW5 (Due Jul 14) |
| **Week 7** | Jul 14, 16 | Perceptron, Gradient Descent, Neural Nets, Nearest Neighbors | AIMA Chapter 21.1-21.2, 19.7 | **Jul 14:** QOW 6<br>HW 6 (Due Jul 21) |
| **Week 8** | Jul 21, 23 | Neural Nets, Nearest Neighbors, Unsupervised Learning | AIMA Chapter 17, 22 | **Jul 21:** QOW 7<br>HW7 (Due Jul 28) |
| **Week 9** | Jul 28, 30 | Reinforcement Learning, Applications and Ethics | AIMA Chapter 17, 22, 27 | **Jul 28:** QOW 8 |
| **Week 10** | Aug 4, 6 | Ethics and Final Review<br>**Final Exam** | AIMA Chapter 27 | **Aug 4:** QOW 9<br>**Aug 6: Final Exam** |