

# CSCE 580 - Artificial Intelligence

Instructor: Pooyan Jamshidi

Spring semesters

<https://pooyanjamshidi.github.io/csce580/>

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Prerequisites: CSCE 350

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## Course Description

This course will introduce the basic ideas and techniques underlying the design of intelligent computer-based systems. As opposed to a traditional logic-based artificial intelligence (AI) course, a specific emphasis will be on statistical inference and machine learning.

## Learning Outcomes

1. Understanding classical as well as recently discovered methods in AI, and explore their potential applications.
2. Building AI systems that make decisions and act in fully informed, partially observable, adversarial environments.
3. Building AI systems that make probabilistic inferences in uncertain and dynamic environments.

## Course Syllabi

1. Lecture 1: Introduction to AI
2. Lecture 2: Intelligent Agents
3. Lecture 3: Uninformed Search: Depth-first, Breadth-first, and Uniform Cost Search
4. Lecture 4: Informed Search: A\* Search, Heuristics, and Adversarial Search
5. Lecture 5: Constraint Satisfaction Problems
6. Lecture 6: Game Trees: Minimax, Expectimax, Utilities

7. Lecture 7: Markov Decision Processes
8. Lecture 8: Reinforcement Learning I
9. Lecture 9: Reinforcement Learning II
10. Lecture 10: Probability
11. Lecture 11: Bayes' Nets, Decision Networks, Hidden Markov Models
12. Lecture 12: Learning: Naïve Bayes
13. Lecture 13: Learning: Perceptrons and Logistic Regression
14. Lecture 14: Learning: Optimization and Deep Neural Networks
15. Lecture 15: Learning: Decision Trees, Support Vector Machines

## Course Projects and Homeworks

The Pac-Man projects apply an array of AI techniques to playing Pac-Man. These projects are designed to teach foundational AI concepts, such as informed state-space search, probabilistic inference, and reinforcement learning.

- P0: UNIX/Python Tutorial
- P1: Search
- P2: Multi-Agent Search
- P3: Reinforcement Learning
- P4: Ghostbusters
- P5: Machine Learning
- Contest: Multi-Agent Adversarial Pacman

## Prerequisites

CSCE 350

## Textbook

Stuart Russell and Peter Norvig (2010). Artificial Intelligence: A Modern Approach (Third Edition). Prentice-Hall.

## Course Policy

### Attendance and class participation

Attendance is essential for success in this course. We encourage students to ask questions and your active participation (by asking or answering questions, sharing experience, discussing project ideas, etc) in this course will enhance your learning experience and that of the other students.

### Academic Integrity

I would encourage you to discuss or brainstorm with other students or professors, but be aware if you copy/paste from other students/Internet, you will simply fail this course. All the potential Honor Code violations will be reported to the Office of Academic Integrity, which has the authority to implement non-academic penalties as described in STAF 6.25 (<http://www.sc.edu/policies/ppm/staf625.pdf>).

### Disabilities Policy

Any student who has a need for accommodation based on the impact of a documented disability, please contact the Office of Student Disability Services: Phone: 803-777-6142, Email: [sasds@mailbox.sc.edu](mailto:sasds@mailbox.sc.edu), Address: 1523 Greene Street, LeConte College Room 112A, Web: [https://www.sc.edu/about/offices\\_and\\_divisions/student\\_disability\\_resource\\_center/index.php](https://www.sc.edu/about/offices_and_divisions/student_disability_resource_center/index.php).

### Details

<https://pooyanjamshidi.github.io/csce580/policies/>