

CS 380: Artificial Intelligence

Course Syllabus

General Information

Instructor: Dr. Dario Salvucci
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Student Learning Information

Course Description

Explores the foundations of artificial intelligence: automated reasoning, knowledge representation, and problem solving. Also covers programming in languages adequate for AI. Additional topics chosen from game theory, decision support systems, pattern matching and recognition, image understanding, natural language, fuzzy and non-monotonic logic, machine learning, theorem proving, and common-sense reasoning.

College/Department: CCI, Department of Computer Science

Repeat Status: Not repeatable for credit

Restrictions: Cannot enroll if classification is Freshman

Prerequisites: CS 260 [Min Grade: D] and CS 270 [Min Grade: D]

Credits: 3 hours of lecture (3 credits total)

Course Purpose within a Program of Study

This course is an advanced Computer Science elective, and a track foundation course for the Artificial Intelligence track.

Statement of Expected Learning

The course objectives are to:

- Describe formalization and solution approaches for hard problems involving search methods.
- Introduce complexity of inference and efficient inference algorithms.
- Discuss the role of heuristics in solving hard problems, including the A* algorithm, admissible heuristics, adversarial search and pruning.
- Practice programming AI representations and algorithms and experimentally explore challenging AI problems through problem formulation, algorithm implementation and experimentation.
- Introduce components of and issues related to agent-based systems and multi-agent systems.

As learning outcomes, students completing this course should be able to:

- Understand formalization and solution approaches for hard problems involving search methods.
- Understand complexity of inference and efficient inference algorithms.
- Understand the role of heuristics in solving hard problems, including Algorithm A*, admissible heuristics, adversarial search and pruning.
- Obtain proficiency in programming AI representations and algorithms and experimentally explore challenging AI problems through problem formulation, algorithm implementation and experimentation.

- Understand components of and issues related to agent-based systems and multi-agent systems.

Course Materials

Required and Recommended Texts, Readings, and Resources

Artificial Intelligence: A Modern Approach, 4th edition (2020)

Stuart Russell and Peter Norvig

Prentice-Hall, 2020

ISBN-10: 0134610997

ISBN-13: 978-0134610993

Textbook Website: <http://aima.cs.berkeley.edu>

[Note: Previous offerings of this course used the 3rd edition of this same book (2009). The 3rd edition works fine for this term as well, but please note that the topic page numbers referenced in the course schedule differ between editions.]

Required and Supplemental Materials and Technologies

None

Assignments, Assessments, and Evaluations

Graded Assignments and Learning Activities

The activities for this course will include both homework assignments and midterm and final exams.

All homework and programming assignments are to be done individually. **Collaborative work is not permitted**, except as explicitly directed.

Homework assignments submitted after the specified deadline will incur a penalty of 33% per day late. Plagiarism and other academic misconducts will be dealt with seriously: in the case of a violation, the assignment or exam in question will receive a grade of zero, the student may receive up to one letter grade penalty on their final course grade, and the violation will be reported to the department, college, and university.

A midterm exam will be given roughly halfway through the course and will cover the material from the first half of the course. The final exam at the end of the course will focus on material from the second half of the course.

Students are responsible for checking Blackboard Learn and Drexel email daily for course announcements. If you have any questions about a project or assignment, please email the instructor at least 24 hours before the deadline.

For more details, please refer to The Drexel University Student Handbook.

Grading Matrix

Grades will be assigned based on the following:

- Homework assignments: 40%
- Exam #1: 30%
- Exam #2: 30%

Grade Scale

The following scale will be used to convert points to letter grades:

Points	Grade	Points	Grade	Points	Grade
Exceptional	A+	82-86.99	B	70-71.99	C-
92-more	A	80-81.99	B-	67-69.99	D+
90-91.99	A-	77-79.99	C+	60-66.99	D
87-89.99	B+	72-76.99	C	0-59.99	F

Note that the instructor may revise this conversion if/when necessary.

Course Schedule

[This schedule is tentative and may change during the course.]

Week	Notes
1	Introduction Rational Agents
2	Problem Solving & Uninformed Search Informed Search, A*, & Heuristics
3	Local Search & CSPs Adversarial Search I
4	Adversarial Search II Logical Agents, LISP
5	Propositional Logic Midterm Exam
6	First-Order Logic Natural Language Processing
7	Machine Learning Reinforcement Learning
8	Neural Networks Game AI
9	Cognitive Models I Cognitive Models II
10	Topics in AI Conclusions & Review
11	Final Exam

Academic Policies

This course follows university, college, and department policies, including but not limited to:

- Academic Integrity, Plagiarism, Dishonesty and Cheating Policy: http://www.drexel.edu/provost/policies/academic_dishonesty.asp
- Student Life Honesty Policy from Judicial Affairs: <http://www.drexel.edu/provost/policies/academic-integrity>
- Students with Disability Statement: <http://drexel.edu/oed/disabilityResources/students/>
- Course Add/Drop Policy: <http://www.drexel.edu/provost/policies/course-add-drop>

- Course Withdrawal Policy: <http://drexel.edu/provost/policies/course-withdrawal>
- Department Academic Integrity Policy: <http://drexel.edu/ci/resources/current-students/undergraduate/policies/cs-academic-integrity/>
- Drexel Student Learning Priorities: <http://drexel.edu/provost/assessment/outcomes/dslp/>
- Office of Disability Resources: http://www.drexel.edu/ods/student_reg.html

The instructor(s) may, at his/her/their discretion, change any part of the course before or during the term, including assignments, grade breakdowns, due dates, and schedule. Such changes will be communicated to students via the course web site. This web site should be checked regularly and frequently for such changes and announcements.

Students [requesting accommodations](#) due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the [ClockWork database](#) before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, visit the DR website at <http://drexel.edu/oed/disabilityResources/overview/> , or contact DR for more information by phone at 215.895.1401, or by email at disability@drexel.edu.

Please note that in Fall 2020, additional guidance due to the COVID-19 pandemic may be issued by the university, college, and department. This guidance should be observed closely as a supplement to the information provided here.