UNIVERSITY OF ARIZONA
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ECE 479/579   **Principles of Artificial Intelligence**   **Spring 2024**

Instructor: Prof. Jerzy W. Rozenblit
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Office hours: Wed 11:00-noon
and by appointment if you need a different time slot

Text: Optional: *Artificial Intelligence: A Modern Approach,* Stuart Russell and
Peter Norvig. (Not mandatory)
Additional materials will be handed out in class.

Goals: The goal of this course is to provide students with an introduction to problems
and techniques of artificial intelligence (AI). Computer Engineering majors and
students pursuing degrees in other fields benefit by learning how to use
problem solving, knowledge representation, and other AI-based techniques.

Prerequisites:

Required: ECE 471 or ECE 473, <u>or equivalent background material</u>,
ability to code in Java, Python, C, or C++
Optional: Course in data structures, discrete mathematics,

Grading

Grades will be determined by total scores with the following weights

Homeworks	25%
Midterm Exams	35%
Term Project	40%

100% - 90% - A, 89% - 80% - B, 79% - 70% - C, 69% - 60% - D, below 60% - E. The ranges may
be adjusted in case of unusual score distribution. For students registered in ECE 579,
problems will be tailored to reflect the graduate level content of the course.

Topics:

1. Introduction: What is Artificial Intelligence?

2. Problem Solving

  2.1 Problems and Problem Spaces
    2.1.1 State space search
    2.1.2 Production systems
    2.1.3 Control Strategies
    2.1.4 Heuristic Search

  2.2 Basic Problem Solving Methods
    2.2.1 Forward and backward reasoning
    2.2.2 Problem trees and graphs
    2.2.3 The role of representation
    2.2.4 Search methods

  2.3 Game Strategies
    2.3.1. Minimax
    2.3.2 Alpha-Beta Search

3. Knowledge Representation (KR)

  3.1 Principles of KR using predicate logic
  3.2 Overview of KR using other logics
  3.3 Structured representations of knowledge

4. Planning

  4.1 Blocks world problems
  4.2 Representation for planning
  4.3 Plan generating systems

5. Introduction to selected advanced topics, including but not limited to computer-guided surgery, intelligent sensing systems, co-evolution, game theory, and big data science.

Withdrawals

Please observe University Regulations concerning dropping of classes. For details see Spring 2024 Schedule of Classes.

PLEASE CAREFULLY REVIEW THE ITEMS LISTED BELOW

Absence and Class Participation Policy

Please check the UA's website for policy concerning Class Attendance, Participation, and Administrative Drops

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored.

Participating in course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their healthcare provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

Required Texts or Readings

Please see above.

Required or Special Materials

None

Required Extracurricular Activities (if any)

None

Assignments and Examinations: Schedule/Due Dates

Please see above

Final Examination or Project

Exam Schedule, http://www.registrar.arizona.edu/schedules/finals.htm

Grading Scale and Policies

PLEASE SEE ABOVE for % and grade distribution.

Requests for incompletes (I) and withdrawal (W) must be made in accordance with University policies

Scheduled Topics/Activities

Please see above.

Bibliography
     Will be distributed in class and via D2L

Classroom Behavior Policy
     To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (i.e. texting, chatting, reading a newspaper, making phone calls, web surfing, etc).

     Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy
     The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Notification of Objectionable Materials
     This course will not likely contain material of a mature nature, which may include explicit language, depictions of nudity, sexual situations, and/or violence. The instructor will provide advance notice when such materials will be used. Students are not automatically excused from interacting with such materials, but they are encouraged to speak with the instructor to voice concerns and to provide feedback.

Accessibility and Accommodations
     Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit http://drc.arizona.edu/**.**

     If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

     Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

     Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/codeofacademicintegrity http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

     The University Libraries have some excellent tips for avoiding plagiarism available at: http://www.library.arizona.edu/help/tutorials/plagiarism/index.html.

     Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-harassment Policy

     The University is committed to creating and maintaining an environment free of discrimination, http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

     Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available the UA's website.
Student Assistance and Advocacy information is available at:
     http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Confidentiality of Student Records

     http://www.registrar.arizona.edu/ferpa/default.htm

Subject to Change Statement

     Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.