

ECE 479/579
Principles of Artificial Intelligence
Spring 2005

Instructor: [Dr. Michael M. Marefat](mailto:marefat@ece.arizona.edu) (marefat@ece.arizona.edu)
Lecture: Tue/Thu (11:00AM - 12:15PM) - ECE 107
Office Hours: TBD
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Syllabus

Purpose: To teach fundamental techniques in design and software development of knowledge-based softwares and systems. Topics include search engines, machine intelligence, computational techniques, symbolic methods, knowledge and data representation and problem solving. The course matches well engineers whose background is Electrical and Computer Engineering (ECE), Computer Science (CS), Industrial Engineering (IE), or Management Information Systems (MIS).

Prerequisite: ECE 373 (or equivalent)

Contents:

1. Example success stories in knowledge-based systems in Design, Diagnosis, and Assembly
2. Dissecting 1-2 successful knowledge systems
3. Symbolic software and programming Symbolic languages Object oriented languages Computational Techniques
4. Capturing engineering and problem solving knowledge for computation Predicate Calculus Symbol Matching, Unification, and Consistency
5. Forward Rule-based Systems AND/OR Trees Solution Graphs Forward Inference Production Systems Databases Rules Control
6. Backward Rule-based Systems Rule-based Diagnosis systems
7. Automatic Theorem Proving Clauses, and Clause generation Resolution Control Methods
8. Planning, Actions, and Scheduling Assembly planning Design problem solving as planning Strips represent actions State-space generation
9. Search and search engines depth first breadth first best first backtracking heuristic graph search
10. Minimax Alpha-Beta Procedure

11. Constraint Satisfaction

Sources:

1. "Artificial Intelligence: A Modern Approach", Stuart Russell, Peter Norvig, Prentice Hall. (Required)
2. "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", George F. Luger, William A. Stubblefield

Requirements and Grading:

The requirements in this course include, 4 homework assignments, 4 projects which include programming, and two examinations. The following will be the basis for grading:

Projects (4) 35 %

Exams (2) 45 %

Assignments (4) 20 %

TOTAL 100%

Office Hours:

TBD

Other times: BY APPOINTMENT (email: marefat@ece.arizona.edu)