
CS 335-31 - Artificial Intelligence
Spring 2004, Northeastern Illinois University

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Meeting: TR 5:40-6:55 PM - CLS 3056

Office hrs: MTWR 4:30-5:30 PM

Description: This course serves as an introduction to different type of expert systems. This systems are used mainly of problems that cannot be addressed using a more traditional approach. We will cover rule-based systems, fuzzy expert systems, neural networks and evolutionary computation. Students will be expected to understand and apply these systems into resolution of sample problems.

Course Prerequisites: CS 304

Text: Negnevitsky, Michael. Artificial Intelligence. A Guide to Intelligent Systems. Pearson, 2002
Recommended Readings: Ferber, Jacques Multi-Agent Systems. An Introduction to Distributed Artificial Intelligence. Addison-Wesley, 1999

Course Outline: (subject to change due to time constraints)

1. Introduction to knowledge-based intelligent systems(Week 1)
 - Intelligent Machines
 - History of AI
2. Rule-based expert systems (Weeks 2-3)
 - Introduction
 - Structure and main characteristics of a rule-based expert system
 - Forward and backward chaining inference techniques
 - Conflict resolution
3. Uncertainty management in rule-based expert systems (Weeks 4-5)
 - Introduction
 - Basic probability theory
 - Bayesian reasoning
 - Application of certainty factors
4. Fuzzy Expert Systems (Weeks 6-7)
 - Introduction
 - Fuzzy sets
 - Operations of fuzzy sets
 - Fuzzy rules and inference
5. Frame-based expert systems (Weeks 8-9)
 - Introduction
 - Frames and inheritance
 - Methods and demons
 - Interaction of frames and rules

6. Artificial neural networks (Weeks 10-11)

- Introduction
- Multilayer neural networks
- The Hopfield network
- Self-organising neural networks

7. Evolutionary Computation (Weeks 12-13)

- Introduction
- Genetic algorithms
- Evolution Strategies
- Genetic programming

8. Additional Topics (Weeks 14-15)

- Hybrid intelligent systems
- Knowledge engineering and data mining
- Multi-agent systems

Assignments:

- **Homeworks:** Students are encouraged to work on the review questions as each chapter is finished
- **Group Projects:** Two group paper presentations.
- **Application Report:** An individual paper submission
- **Exams:** A Midterm and a Final

There will be no makeup for missed exams

Grading Policies:

1. Each Group Project will be worth 15% of your grade. The Application Report will be worth 20% of your grade. The Midterm and the Final will be worth 25% of your grade (each). Those students taking the class for graduate credit will be required and extra assignment to be discussed with the instructor.
2. Group projects assume collaboration. With the submission of a project students will be required to assess participation in an anonymous way. To preserve the integrity of the process, participation assessment will be applied to the projects score at the end of the semester and will affect directly the research project portion of a students final grade.
3. Regular attendance is expected. Any student who misses more than three class meetings will have her/his final course grade reduced by a letter
4. Cheating on exams or projects will guarantee the student an F grade, and a report according to school's guidelines
5. No Ws, Is will be granted after the school's withdrawal deadline (Fri, March 19th)
6. Your final grade will be based on the following scale: (undergraduate / graduate)
 - **A** - 90% or above / same
 - **B** - 75 – 90 % / 80 – 90 %
 - **C** - 60 – 75 % / 65 – 80 %
 - **D** - 50 – 60 % / 50 – 65 %
 - **F** - below 50% / same

If you have a physical, psychological, medical or learning disability that may impact on your ability to carry out assigned course work, I would urge that you contact the staff in the Accessibility Center office, Room A-118 in the A-Wing, exts. 5495, 5496, and 5497. The Accessibility Center will review your concerns and determine with you what accommodations are necessary and appropriate. All information and documentation of disability are confidential.