CMSC 421: INTRODUCTION TO ARTIFICIAL INTELLIGENCE
Fall 2009

Instructor: James A. Reggia (AVW 3233; 301-405-2686; reggia@cs.umd.edu)
Office Hours: Thurs. 3:15 - 4:30 PM, or by appointment
Teaching Asst.: Thuan Huynh (AVW 1112; 301-405-2775; thuan@cs.umd.edu)
Office Hours: Mon. 1:30 - 3 pm, or by appointment
Time and Place: TuTh 2:00 - 3:15 pm, CSI 1121
Class web page: http://www.cs.umd.edu/class/fall2009/cmsc421/
Prerequisites: CMSC 330 and CMSC 351; or CMSC 420
Goals and Objectives: The primary goal of this course is to provide a broad introduction to artificial intelligence (AI). The specific objectives are to develop knowledge of AI programming methods, to provide an introductory survey of past work in AI, and to examine in greater depth selected specific topics in problem solving, inference, and machine learning.
Content:

Introduction: defining AI, history, overview, implications

1. AI Programming Languages and Methods:
   - lisp symbolic programming methods
   - introduction to prolog, other AI languages
2. Traditional Problem-Solving Methods:
   - search: state spaces, heuristic search, constraint satisfaction, game trees, problem-reduction
   - logic: first-order logic, mechanical theorem proving, clause form, resolution, nonmonotonic reasoning
3. AI in Action:
   - knowledge representation and inference: rules, semantic nets, frames
   - expert systems: Bayesian inference, rule-based systems, causal/Bayesian networks, abduction, knowledge acquisition
   - planning methods: basic, partial-order, HTN; issues
   - natural language processing: syntactic and semantic approaches
4. Learning and Adaptation:
   - machine learning: inducing descriptions, rules, decision trees, and causal nets
   - neural models: perceptrons, error back-propagation, self-organizing feature maps
   - evolutionary computation: genetic algorithms, classifier systems, genetic programming,
   - artificial life: multi-agent artificial worlds, communication, self-replication

Workload: Midterm (35%), homework/projects/quizzes (15%), final exam (50%).
Texts:

1. *Artificial Intelligence* (Second Edition), S. Russell & P. Norvig, Prentice Hall, 2003. ISBN: 0-13-790395-2
2. *ANSI Common LISP*, P. Graham, Prentice Hall, 1996. ISBN: 0-13-370875-6
3. Additional readings from the literature.