CS 462: Artificial Intelligence

1. Course number and name:   CS 462  Artificial Intelligence

2. Credits and contact hours:  3.000 Credit Hours, 3.000 Lecture hours

3. Instructor or course coordinator:   Neli Zlatareva


- other supplemental materials
  - Course syllabus and lecture notes are available online at: http://www.cs.ccsu.edu/~neli/
  - The course uses Blackboard/Vista for projects and grade book.

5. Specific course information

- brief description of the content of the course (Catalog Description): Presentation of artificial intelligence as a coherent body of ideas and methods to acquaint the student with the basic programs in the field and their underlying theory. Students will explore this through problem-solving paradigms, logic and theorem proving, language and image understanding, search and control methods and learning.

- Prerequisites: CS 253.

- indicate whether a required, elective, or selected elective course in the program: Elective.

6. Specific goals for the course

- Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.

**Course outcome 1:** The student will learn the basics of the theory and practice of Artificial Intelligence as a discipline about intelligent agents capable of deciding what to do, and do it.

**Course outcome 2:** The student will be introduced to Artificial Intelligence programming.

**Course outcome 3:** The student will learn to apply knowledge representation techniques and problem solving strategies to common AI applications.

**Course outcome 4:** The student will design simple software to experiment with various AI concepts and analyze results.

**Course outcome 5:** The student will build self-learning and research skills to be able to tackle a topic of interest on his/her own or as part of a team.
b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

The department’s outcomes (a) an ability to apply knowledge of computing and mathematics appropriate to the discipline, (b) an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution, (c) an ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, (f) an ability to communicate efficiently, (h) recognition of the need for and an ability to engage in continuing professional development, (i) an ability to use current techniques, skills, and tools necessary for computing practice, (j) an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

7. Brief list of topics covered

- Introduction to LISP: basic LISP primitives, procedure definition and binding, predicates and conditionals, procedure and data abstraction, mapping.
- Intelligent agents: a discussion on what Artificial Intelligence is about and different types of AI agents.
- Knowledge-based agents and logical problem solving: introduction to knowledge representation and propositional logic.
- First-order logic as a basis for building intelligent agents capable of acting and reacting in a complex environment.
- Knowledge engineering: building knowledge bases and automated theorem provers. Production systems as an example of logical problem solving.
- Uncertainty representation and management: introduction to truth-maintenance systems, default reasoning, and probabilistic problem solving.
- Planning agents: representation of states, goals and actions. The block-world example.
- Learning agents: learning from observations and examples. Decision trees and the ID3 algorithm.
- Applications of AI: Semantic Web.

8. Expected Performance Criteria

Students will demonstrate their mastery of AI concepts and techniques in several (five) homework assignments, and a research project. The topic of the project is chosen by the student according to his/her interests, and involves a research component summarized in a paper and presented at a student seminar. The student’s understanding of the core material covered in this class is demonstrated on two midterms and the final exam.