CSCE 580: Artificial Intelligence

1. Course number and name: CSCE 580: Artificial Intelligence

2. Credit: 3-hrs; Contact: 3 lecture periods of 50 minutes or 2 periods of 75 minutes per week

3. Instructor: Valtorta

4. Textbook: David Poole and Alan Mackworth. *Artificial Intelligence: Foundations of Computational Agents.* Cambridge University Press, 2010.

5. Specific course information
    a. Catalog description: Heuristic problem solving, theorem proving, and knowledge representation, including the use of appropriate programming languages and tools.
    b. Prerequisites: CSCE 350
    c. CSCE 5xx elective

6. Specific goals for the course
    a. Specific outcomes of instruction are that students will be able to:
        1. Analyze and understand software agents
        2. Formalize computational problems in the state-space search approach and apply search algorithms (especially A*) to solve them
        3. Represent domain knowledge using features and constraints and solve the resulting constraint processing problems
        4. Represent domain knowledge about objects using propositions and solve the resulting propositional logic problems using deduction and abduction
        5. Reason under uncertainty using Bayesian networks
        6. Represent domain knowledge about individuals and relations using first-order logic
        7. Use resolution refutation for theorem proving
        8. Represent knowledge in Horn clause form and use Prolog for reasoning

    b. As an elective this course cannot be counted upon to contribute to the attainment of any student outcome.

7. Topics covered and approximate weight (14 weeks, 3 hours/week, 42 hours total)
    1. Intelligent agents (3 hours)
    2. State-space search (6 hours)
    3. Constraint satisfaction (6 hours)
    4. Propositional calculus, deduction, and abduction, and knowledge representation (6 hours)
    5. Reasoning under uncertainty (4 hours)
    6. First-order logic (4 hours)
    7. Theorem proving using resolution refutation (3 hours)
    8. Horn clause logic and Prolog (3 hours)

9. Uncertain knowledge and reasoning (3 hours)
10. Review and examinations (4 hours)