School of Computing and Information Sciences

Course Title: Artificial Intelligence **Date:** November 28, 2016

Course Number: CAP-4630

Number of Credits: 3

Subject Area: Computer Applications	**Subject Area Coordinator:** ?? **email:** ??
Catalog Description: Introduction to all major topics in artificial intelligence, including search, logic, optimization, constraint satisfaction, planning, multiagent systems, and machine learning.	
Textbook: Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd Edition, ISBN-13: 978-0136042594, ISBN-10: 0136042597	
References: None	
Prerequisites Courses: COP3530 (Data Structures) or equivalent	
Corequisites Courses: None	

Type: Elective for the CS Major

Prerequisites Topics:

- Familiarity with basic techniques of algorithm analysis and data structures
- Familiarity with mathematical analysis
- Familiarity with at least one modern programming language (e.g., C, C++, Java, Matlab, Python)

Course Outcomes:

1. Introduce the core topics of AI.

2. Prepare students for further advanced study in each area.

3. Introduce students to the major tools from AI that are useful for industrial applications.

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Relationship between Course Outcomes and Program Outcomes

BS in CS: Program Outcomes	Course Outcomes
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	1,2,3
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	1,2,3
c) Demonstrate proficiency in problem solving and application of software engineering techniques	1,3
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	
g) Demonstrate effective communication skills.	1,2,3

Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan: http://www.cis.fiu.edu/programs/undergrad/cs/assessment/

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Outline

Topic	Lecture Hours	Outcome

• Search & Logic
  • Informed search
  • Logic
  • Satisfiability
	10	1,2,3

• Optimization and Planning
  • Constraint Satisfaction
  • Mixed Integer Programming
  • Linear Programming
  • Markov Decision Processes
  • Reinforcement Learning
	10	1,2,3

• Machine Learning and Probabilistic Reasoning
  • Probability
  • Graphical Models
  • Hidden Markov Models
  • Bayesian Networks
  • Classification
  • Clustering
	10	1,2,3

• Multiagent Systems and Game Theory
  • Solution Concepts
  • Sequential Games
  • Social Choice
  • Mechanism Design
	6	1,2,3

Total	36	

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
Homework problems addressing Search and Logic (Outcomes 1,2,3)	3
Homework problems addressing Optimization and Planning (Outcomes 1,2,3)	3
Homework problems addressing Machine Learning and Data Science (Outcomes 1,2,3)	4
Homework problems addressing Multiagent Systems and Game Theory (Outcomes 1,2,3)	2

Oral and Written Communication

No significant coverage

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
0	0	0	0

Social and Ethical Implications of Computing Topics

No significant coverage

Topic	Class time	Student Performance Measures

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Approximate Number of Credit Hours Devoted to Fundamental CS Topics

Fundamental CS Area	Core Hours	Advanced Hours
Algorithms	1	1
Software Design	0.5	-
Computer Organization and Architecture	-	-
Data Structures	0.5	-
Concepts of Programming Languages	-	-

Theoretical Contents

Topic	Class time
Artificial Intelligence	12

Problem Analysis Experiences

None

Solution Design Experiences

None

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The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

Area	Topic	Type	Lecture Hours
AL	Algorithmic Strategies	Tier1	1
AL	Algorithmic Strategies	Tier2	1
AL	Fundamental Data Structures and Algorithms	Tier1	1
CN	Modeling and Simulation	Elective	3
DS	Discrete Probability	Tier1	2
IS	Fundamental Issues	Tier2	4
IS	Basic Search Strategies	Tier2	4
IS	Basic Knowledge Representation and Reasoning	Tier2	4
IS	Basic Machine Learning	Tier2	4
IS	Advanced Search	Elective	4
IS	Reasoning Under Uncertainty	Elective	4
IS	Agents	Elective	4
Total			**36**

[1]See Appendix A in *Computer Science Curricula 2013.* Final Report of the IEEE and ACM Joint Task Force on Computing Curricula, available at: http://www.acm.org/education/CS2013-final-report.pdf