Knight Foundation School of Computing and Information Sciences

Course Title: Artificial Intelligence for All **Date:** 12/15/2018

Course Number: IDC 2002

Number of Credits: 3

Subject Area: Computer Applications	**Subject Area Coordinator:** Masoud Sadjadi **email:** sadjadi@cs.fiu.edu
Catalog Description: High-level conceptual survey of artificial intelligence for non-CS undergraduate students, including techniques, applications, ethics, and philosophical issues. No high-level math or programming required.	
Textbook: Neapolitan, Richard E. & Jiang, Xia (2018) *Artificial Intelligence: With an Introduction to Machine Learning*, 2nd edition. Chapman and Hall / CRC Press, ISBN 9781138502383.	
References: None	
Prerequisites Courses: None	
Corequisites Courses: None	

Type: Elective for Non-CS Majors

Prerequisites Topics:

- Pre-college mathematics: functions and algebra

Course Outcomes:

After completing this course, students will be able to:

1. Describe a selection of fundamental concepts, methods, and models used in AI.
2. Order by relative difficulty different AI problems and tasks and explain at a high level why some tasks are harder for AIs than others.
3. Identify the class of AI techniques that might be applied to a specific task.
4. Explain the basic philosophical and ethical positions and concerns currently at play in the field
5. Identify practical implications of AI for different fields, such as manufacturing, education, medicine, or law.
6. Describe and discuss recent applications of Artificial Intelligence, such as to autonomous navigation, image processing, speech recognition, and text processing

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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	n/a*
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	n/a*
c) Demonstrate proficiency in problem solving and application of software engineering techniques	n/a*
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	n/a*
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	n/a*
f) Demonstrate the ability to work cooperatively in teams.	n/a*
g) Demonstrate effective communication skills.	n/a*

*This course may not be taken by computer science majors. It is intended for non-majors

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: https://abet.cs.fiu.edu/csassessment/

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Outline

Topic	Number of Lecture Hours (Total: 37.5 hours = 15 weeks * 2 lectures/week * 1.25 hrs/lecture)	Outcome
Overview of Artificial Intelligence • What is the goal of AI? • Science-side vs. engineering-side AI • Cognitive modeling vs. engineering applications	5	1,2
Philosophical Issues • What is the definition of intelligence? • How can we determine if something is intelligent? • Is a truly intelligent machine possible? • Are current AIs intelligent?	3.75	1,4
Ethical & Social Issues • Can AI's be moral agents? • Can AI's be ethical? • Could an AI have a soul? • What are the implications of AI for privacy? • What are the implications of AI for the workforce? • What are the implications of AI for the economy? • What are the implications of AI for society?	3.75	1,4,5
Problem Solving & Search • Problem formulation • Search Trees • Breadth-first Search • Game Playing Search • Example: Playing chess and Deep Blue	6.25	1,3,6
Logical Reasoning • Representing Knowledge • Propositional Logic • Modus Ponens • Forward Chaining • Example: Question answering and IBM Watson	6.25	1,3,6
Probablistic Learning • Basic probability and chance • Random variables • Event spaces • Full joint probability tables • Conditional reasoning • Example: Speech processing and Siri and Alexa	6.25	1,3,6
Machine Learning • What is inference? • Supervised machine learning paradigm • Nearest neighbors algorithm • Single-layer neural networks • Example: Object recognition and Google image search • Example: Machine translation and Google Translate	6.25	1,3,6

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
Essay assignment addressing philosophical and ethical issues	4
Homework problems addressing problem solving and search	2
Homework problems addressing logical reasoning	2
Homework problems addressing probabilistic reasoning	2
Homework problems addressing machine learning	2

Oral and Written Communications

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
1	5	0	0

Social and Ethical Implications of Computing Topics

Topic	Class time	Student Performance Measures
Definition of intelligence	2	Essay, free-answer questions on exams.
AI & ethics	2	Essay, free-answer questions on exams.
AI & social impact	2	Essay, free-answer questions on exams.

Approximate Number of Credit Hours Devoted to Fundamental CS Topics

Fundamental CS Area	Core Hours	Advanced Hours
CN – Computational Science	6	-
DS – Discrete Structures	5	-
IS – Intelligent Systems	22	-
SP – Social Issues and Professional Practice	4	-

Theoretical Contents

Topic	Class time
Artificial Intelligence	37

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Problem Analysis Experiences

None

Solution Design Experiences

None

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

Area	Topic	Type	Lecture Hours
CN	Introduction to Modeling and Simulation	Tier 1	4
CN	Data, Information, and Knowledge	Elective	2
DS	Basic Logic	Tier 1	3
DS	Discrete Probability	Tier 1	2
IS	Fundamental Issues	Tier 2	6
IS	Basic Search Strategies	Tier 2	4
IS	Basic Knowledge Representation & Reasoning	Tier 2	4
IS	Basic Machine Learning	Tier 2	4
IS	Reasoning Under Uncertainty	Elective	4
SP	Privacy and Civil Liberties	Tier 1	2
SP	History	Elective	2
Total			**37**

[1]See Appendix A in *Computer Science Curricula 2013.* Final Report of the IEEE and ACM Joint Task Force on Computing Curricula, available at: https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf