School of Computing and Information Science

Course Title: Concepts of Artificial Intelligence **Date:** 11/15/2018

Course Number: CAP 5XXX

Number of Credits: 3

Subject Area: Intelligent Systems	**Subject Area Coordinator:** **email:**
Catalog Description: High-level conceptual survey of artificial intelligence for non-CS graduate 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	
Prerequisite Courses: None	
Corequisite Courses: None	

Type: **Elective**

Prerequisite Topics:

- Pre-College Mathematics

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

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 the structure of 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 • 2-node Bayes Nets • 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