DO NOT TYPE IN THIS BOX

Bulletin # : 3

Academic Year : 2018-19

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a New Course

1. **School/College** Engineering and Computing
   Div./Dept. in Which Taught School of Computing and Information Sciences

2. | Alpha Prefix | 1st Digit | Last 3 Digits | "C"-lec-lab "L"-Lab | Cr. Hrs. |
   |---|---|---|---|---|
   | IDC | 5 | | | 3 |

   CIP Code *(Leave this blank):*

IDC 5007

3. **Grading Method (select one):** ☒ Graded ☐ Pass/Fail

4a. **Course Title** Concepts of Artificial Intelligence

b. **Abbreviated course Title** *(for computer class schedules, transcripts)* AI Concepts

LIMITED TO 25 Characters *(including spaces)*

5. **Statewide Course Numbering Subject Matter Area** CIS (Computing and Information Sciences)

6. **Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*
   College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

   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.

7. **Attach detailed syllabus course outline and course justification on separate page(s).**

8. **Prerequisite(s):** None

9. **Corequisite(s):** None

10. **Objective(s) of Course:**

    Develop a non-technical understanding of and appreciation for the field of artificial intelligence (AI), with emphasis on high-level concepts and principles.

11. **Does this course duplicate/overlap other courses at FIU?** ☒ No ☐ Yes
    If yes, please explain:

12. **What other closely related department(s) have been consulted about this course?**
    Department of Electrical and Computer Engineering

PROPOSAL REQUESTED BY:

Faculty Contact Mark Finlayson (Type name) — (Signature) — 11 / 28 / 2018

markaf@fiu.edu (Email address) — x7988 (Phone number)

Chairperson (Dept./Div.) Ram Iyengar (Type name) — (Signature) — 11 / 28 / 2018

Chairperson (Curr. Comm.) Cesar Levy (Type name) — (Signature) — 12 / 4 / 2018

College/School Dean John Volakis (Type name) — (Signature) — / / 2018

Submit one original form. Attach one copy of the course syllabus containing: course description, objectives, learning outcomes, major topics and textbooks.

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

Concepts of Artificial Intelligence

Course Justification

Artificial intelligence (AI) is ushering in a new age of society involving unprecedented integration of machines into our lives. This extends from AI technologies embedded in our cell phones, personal devices, and computers, to technologies that are assisting and oftentimes replacing workers in the work place, to fundamental changes in economy, politics, and society. It is increasingly critical that a well-educated citizen understand what AI is, how it work at a high level, and what it means for individuals, society, and the future.

There are several AI courses at FIU, including undergraduate and graduate introductions to AI, machine learning, and data science classes, among others. All these classes, however, are offered only for computer science majors and require significant technical preparation. There are no course offerings by AI experts in computer science that are tailored to non-majors seeking a general understanding AI and its implications. This course will provide a general graduate-level overview of AI for non-computer-scientists, covering the topic in a non-technical way such that students can appreciate the broad contours of the field, understand what AI is capable of, and begin to separate hype from reality.

The covered topics will include: the definition of intelligence and the basic scientific and engineering paradigms of the field; solving problems by search; using logic to represent and reason with knowledge; using probability to reason under uncertainty; and using statistics to learn patterns from data; and the ethical, philosophical, and social implications of AI. The course will focus on conceptual understanding and understanding the principles of the field, without requiring deep technical background. The course will use illustrate concepts by linking them to well-known systems that prevalent in wider society, such as game-playing programs (like chess programs or IBM's Deep Blue), speech recognition and dialog systems (automated call centers, Apple's Siri, Amazon's Alexa), machine translation (Google Translate), image search (Google reverse image search), and search and question answering systems (Google Search, IBM Watson).

This new course will give our students the knowledge they need to adapt to a world and a workplace that is rapidly changing under the influence of AI and provide them with critical understanding that is in demand in the marketplace.