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

   CIP Code *(Leave this blank):* _____

IDC 2002

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

4a. **Course Title** Artificial Intelligence for All

b. **Abbreviated course Title** *(for computer class schedules, transcripts)* AI for All
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 undergraduates, 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?**
None

PROPOSAL REQUESTED BY:

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

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

Chairperson (Dept./Div.) S.S. 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.

Artificial Intelligence for All

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 works 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 undergraduate-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 illustrate concepts by linking them to well-known systems 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.

School of Computing and Information Sciences

Course Title: Artificial Intelligence for All **Date:** November 15, 2018

Course Number: IDC-2XXX

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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Artificial Intelligence for All

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: http://www.cis.fiu.edu/programs/undergrad/cs/assessment/

School of Computing and Information Sciences
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Artificial Intelligence for All

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.

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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

Problem Analysis Experiences

None

Solution Design Experiences

None

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Artificial Intelligence for All

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: http://www.acm.org/education/CS2013-final-report.pdf

IDC 2xxx: Artificial Intelligence for All
Syllabus

Taught by:
Mark A. Finlayson
ECS Room 362
markaf@fiu.edu / (305) 348-7988

Summary:
This class is an introduction to theoretical, practical, and ethical aspects of artificial intelligence (AI) for non-CS majors. In this class students will be familiarized with the high-level concepts and principles behind AI techniques and algorithms, including search, logic, reasoning, and machine learning. In homework they will tackle key questions and problems in the field, as well as simulate by hand key processes. No high-level mathematics or knowledge of programming is 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.

Times & Locations:
Lecture will be held twice a week for 1 hour, 15 minutes;
Office hours will be held once a week.
Electronic devices are not allowed in class.

Grading

Homework (5)	24%
Essay (5 pages)	24%
Midterm Exam	24%
Final Exam	24%
Class Participation	4% (attendance will be noted)

Reading
Reading assignments will be distributed via the website. Readings will be associated with each lecture, and these should be completed before lecture begins, as we will rely on content in the reading during lecture.

Homework
There will be 5 homework assignments. Homeworks must be submitted electronically as a single pdf file via the website. If you need an extension on the homework, please ask for one: I usually grant extensions except in the case of serial abusers of the privilege.

Essay
There will be one essay assignment of 5 pages, assigned after the midterm and due within three weeks, where the student will be asked to discuss an issue of interest to them from the philosophical, ethical or societal aspects of artificial intelligence.

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Exams

There will be two exams: a midterm and a final. The exams will be closed-book. Students will be allowed to bring one double-sided letter-sized piece of paper with notes.

Academic Integrity

Students are expected to uphold the highest standards of academic integrity during the course. Students are encouraged to collaborate with each other on homeworks; however, collaborations should be noted on the first page of the submission to avoid the appearance of cheating. In no case are solutions directly copied from elsewhere allowed: students must write up their own solutions in their own words, drawing their own figures, constructing their own tables, and performing their own calculations. Use of external materials to gain insight into homeworks is also encouraged; nevertheless, if a student consults or quotes external materials this should be noted next to the solution and the citation provided. If students present other's work as their own, without proper citation, this will be treated as plagiarism and disciplined appropriately; students that have supplied the copied material with the intent to aid in plagiarism, that supplying student will be considered an accomplice and will sanction in the same was as with direct plagiarism.