DEREE COLLEGE SYLLABUS FOR:

ITC 2164 FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE   **US CR: 3/0/3**
(Spring 2024)

PREREQUISITES:	ITC 1070 Information Technology Fundamentals *or* ITC 2088 Introduction to Programming
CATALOG DESCRIPTION:	Introduction to artificial intelligence. Concepts in knowledge representation, state space search, machine learning. Modern applications. LLMs. Games.
RATIONALE:	The course introduces the students to artificial intelligence concepts, methodologies and structures used for unstructured problem solving. Students are exposed to knowledge representation, problem state space, machine learning, as well as modern AI implementations in Large Language Models (LLMs) and games.
LEARNING OUTCOMES:	As a result of taking this course, the student should be able to: 1. Demonstrate knowledge and understanding of unstructured problems, their classifications, and AI systems types. 2. Demonstrate knowledge and understanding of knowledge representation and inferencing. 3. Apply state space search for problem solving. 4. Demonstrate knowledge and understanding of machine learning methodologies.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: • Classroom lectures, discussions, and review of theoretical concepts. Laboratory practical sessions. • Office hours: Students are encouraged to make full use of the office hours of their instructor, where they can ask questions and go over lecture material. • Use of the Blackboard Learning platform, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.

ASSESSMENT:	**Summative:**	
	1st assessment: Coursework Case and programing problems	**40%**
	2nd assessment: Portfolio of student work and oral assessment	**10%**
	Final assessment: Final Examination Short open-ended questions	**50%**
	Formative:	
	In class and home short problems and quizzes	**0%**
	The formative assessments aim to prepare students for the summative assessments and expose them to teamwork. The 1st summative assessment tests LO 1,2,3. The 2nd summative assessment tests LOs 1-4. The final summative assessment tests LOs 1-4.	

	*The final grade for this module will be determined by averaging all summative assessment grades, based on predetermined weights for each assessment. If students pass the **final summative assessment,** which tests all Learning Outcomes for this module, and the average grade for the module is 40 or above, students are not required to resit any failed assessments.*
INDICATIVE READING:	**REQUIRED READING:** 1. Finlay, J. (2020). *An Introduction To Artificial Intelligence*. CRC Press. **RECOMMENDED READING:** 1. Russell, S. and Norvig, P. (2021). *Artificial Intelligence: A Modern Approach, Global Edition.* Pearson. 2. Kapur, R., (2023). *AI Made Simple: A Beginner's Guide to Generative Intelligence*, ISBN 9781962017008, Rinity Media (Kindle edition).
INDICATIVE MATERIAL: *(e.g. audiovisual, digital material, etc.)*	**REQUIRED MATERIAL**: 1. Introduction to propositional logic: https://www.youtube.com/watch?v=5NGKbiA04Cw 2. State Space Search (Tic Tac Toe problem): https://www.youtube.com/watch?v=SLgZhpDsrfc **RECOMMENDED MATERIAL:** N/A
COMMUNICATION REQUIREMENTS:	Daily access to the course's site on the College's Blackboard CMS. Use of word processing, spreadsheet and/or presentation graphics software for documentation of assignments
SOFTWARE REQUIREMENTS:	Python or C/C++ or Java
WWW RESOURCES:	• A book under creative commons licence http://artint.info/index.html • American Association for Artificial Intelligence (AAAI) http://www.aaai.org • European Coordinating Committee for Artificial Intelligence (ECCAI) http://www.eccai.org • MIT Artificial Intelligence Lab http://www.ai.mit.edu • German Institute of Artificial Intelligence (DFKI) https://www.dfki.de/en/web

INDICATIVE CONTENT:	1. AI: Foundations and Applications
	   a. Introduction
	   b. AI Foundations
	   c. Agents, Problem classification and Environments
	2. Logic
	   a. Propositional
	   b. Predicate
	   c. Inference
	3. Solving Problems by Search
	   a. State Space Representation
	   b. Search strategies
	   c. Heuristics
	   d. Multi-agent search
	4. Concepts in Machine Learning
	   a. Decision trees

	b. Neural networks 5. Modern AI applications: Generative AI, games