

DEREE COLLEGE SYLLABUS FOR:

ITC 4380 ARTIFICIAL INTELLIGENCE PRINCIPLES

(Previously ITC 4680)
(Updated Fall 2021)

US CR: 3/0/3
UK LEVEL: 6
UK CREDITS: 15

PREREQUISITES:	ITC 2088 Introduction to Programming ITC 2197 Object Oriented Programming Techniques <i>or</i> ITC 3234 Object Oriented Programming ITC 3006 Mathematics for Computing												
COREQUISITES:	None.												
CATALOG DESCRIPTION:	State space search, knowledge representation, probabilistic reasoning, machine learning.												
RATIONALE:	The course is designed to introduce students to the structures and strategies used for unstructured problem solving. Emphasis is given on knowledge representation, reasoning under uncertainty, machine learning and implementation.												
LEARNING OUTCOMES:	As a result of taking this course, the student should be able to: 1. Design a logic-based system including knowledge representation and inferencing. 2. Compare and contrast different search strategies, adapt the most pertinent one to a given problem and evaluate the results. 3. Adapt machine learning techniques to a given problem and elaborate on the results.												
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: <ul style="list-style-type: none"> • 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:	<table border="1"> <tr> <td colspan="2">Summative:</td> </tr> <tr> <td>1st assessment: Mid-term Examination Quantitative and/or qualitative solutions in mathematical and/or short essay format</td> <td style="text-align: right;">30%</td> </tr> <tr> <td>2nd assessment: Portfolio of student work and oral assessment</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Final assessment: Project Programming and/or tool usage to address one or more problems in artificial intelligence.</td> <td style="text-align: right;">60%</td> </tr> <tr> <td colspan="2">Formative:</td> </tr> <tr> <td>In class and home short problems and quizzes</td> <td style="text-align: right;">0%</td> </tr> </table>	Summative:		1 st assessment: Mid-term Examination Quantitative and/or qualitative solutions in mathematical and/or short essay format	30%	2 nd assessment: Portfolio of student work and oral assessment	10%	Final assessment: Project Programming and/or tool usage to address one or more problems in artificial intelligence.	60%	Formative:		In class and home short problems and quizzes	0%
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	<p>The formative assessments aim to prepare students for the summative assessments and expose them to teamwork.</p> <p>The 1st summative assessment tests LO 1,2.</p> <p>The 2nd summative assessment tests LOs 1-3.</p> <p>The final summative assessment tests LOs 2-4.</p> <p><i>Students are required to resit failed assessments in this module.</i></p>
INDICATIVE READING:	<p>REQUIRED READING:</p> <ol style="list-style-type: none"> 1. Stuart, R. and Peter, N. (2021). <i>Artificial Intelligence: A Modern Approach</i>. Upper Saddle River, NJ: Prentice-Hall <p>RECOMMENDED READING:</p> <ol style="list-style-type: none"> 1. Bishop, CM., (2007). <i>Pattern Recognition and Machine Learning</i>, Springer. 2. Mitchel, T.M., (1997). <i>Machine Learning</i>, McGraw Hill. 3. Poole, D., and Mackworth, A. (2010). <i>Artificial Intelligence: Foundations of Computational Agents</i>, Cambridge University Press (free through ResearchGate). 4. Rouhiainen, L., (2018). <i>Artificial Intelligence: 101 Things you must know today about our future</i>, CreateSpace IPP, Kindle edition available.
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: N/A</p>
COMMUNICATION REQUIREMENTS:	<p>Daily access to the course's site on the College's Blackboard CMS.</p> <p>Use of word processing, spreadsheet and/or presentation graphics software for documentation of assignments</p>
SOFTWARE REQUIREMENTS:	<p>Weka, Prolog, Java</p>
WWW RESOURCES:	<ul style="list-style-type: none"> • A book under creative commons licence http://artint.info/index.html • http://alumni.media.mit.edu/~jorkin/aibooks.html • http://meta-guide.com/videography • 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) http://www.dfki.de/web/welcome?set_language=en&cl=en
INDICATIVE CONTENT:	<ol style="list-style-type: none"> 1. AI: Foundations and Applications <ol style="list-style-type: none"> a. Introduction b. Foundations c. Agents and Environments 2. Logic <ol style="list-style-type: none"> a. Propositional b. Predicate c. Inference

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| | <ol style="list-style-type: none">3. Solving Problems by Search<ol style="list-style-type: none">a. State Space Representationb. Search Strategiesc. Heuristics: Admissibility, monotonicity, informednessd. Min-Max4. Planning5. Applications of AI in games & Procedural Content generation6. Concepts in Machine Learning7. Optional: Natural Language Processing |
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