

## H8AI: Artificial Intelligence

Module Code:	H8AI
Long Title	Artificial Intelligence <b>APPROVED</b>
Title	Artificial Intelligence
Module Level:	LEVEL 8
EQF Level:	6
EHEA Level:	First Cycle
Credits:	10
Module Coordinator:	
Module Author:	Alex Courtney
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	MSc and/or PhD degree in computer science or cognate discipline. May have industry experience also.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
<b>#</b>	<b>Learning Outcome Description</b>
LO1	Describe the theory and concepts underpinning Artificial Intelligence (AI) and outline the historical evolution of AI.
LO2	Evaluate and apply the technical and practical skills for constructing algorithms used in various real-world applications such as natural language processing.
LO3	Demonstrate and evaluate the use of structures for knowledge representation and logical reasoning systems while solving practical AI problems.
LO4	Evaluate the architecture of intelligent agents to solve real world problems.
<b>Dependencies</b>	
<b>Module Recommendations</b>	
No recommendations listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Entry requirements</b>	Learners should have attained the knowledge, skills and competence gained from stage 3 of the BSc (Hons) in Computing.

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Module Content & Assessment			
Indicative Content			
<b>Introduction to Artificial Intelligence</b> Foundations of AI: philosophy, maths, psychology, computing, linguistics, logic, probability theory Historical evolution of the field Weak vs Strong AI Ethical implications of AI			
<b>Agents</b> Precepts, actions, goals, environment Rational agents Environments Agent functions and programs Simple reflex agents Reflex agents with state Goal based agents Utility based agents			
<b>Search-Based Problem Solving</b> Utility based agents Performance State space search Uninformed Search strategies: Uniform Cost, Depth-First, Depth-Limited, Iterative Deepening			
<b>Reasoning</b> Propositional Logic First Order Logic Inference in First Order Logic			
<b>Knowledge Representation</b> Ontological Engineering Categories, objects and events Semantic networks			
<b>Bayesian Networks</b> Quantifying Uncertainty Bayes' Rules and its use			
<b>Natural Language Processing</b> Language models Retrieval, extraction and classification for natural language processing			
<b>Recommender Systems</b> Recommender systems introduction and examples Basic models of recommender systems			
Assessment Breakdown			%
Coursework			40.00%
End of Module Assessment			60.00%
Assessments			
Full Time			
Coursework			
<b>Assessment Type:</b>	Formative Assessment	<b>% of total:</b>	Non-Marked
<b>Assessment Date:</b>	n/a	<b>Outcome addressed:</b>	1,2,3,4
<b>Non-Marked:</b>	Yes		
<b>Assessment Description:</b> Formative assessment will be provided on the in-class individual or group activities. Feedback will be provided in written or oral format, or on-line through Moodle. In addition, in class discussions will be undertaken as part of the practical approach to learning.			
<b>Assessment Type:</b>	Project	<b>% of total:</b>	40
<b>Assessment Date:</b>	n/a	<b>Outcome addressed:</b>	3,4
<b>Non-Marked:</b>	No		
<b>Assessment Description:</b> Project where the students need to implement AI into an application of their choice (e.g., chess game, chat bot, etc.). This project would built on students' previous skills in programming (e.g. Python), and machine learning.			
End of Module Assessment			
<b>Assessment Type:</b>	Terminal Exam	<b>% of total:</b>	60
<b>Assessment Date:</b>	End-of-Semester	<b>Outcome addressed:</b>	1,2,3,4
<b>Non-Marked:</b>	No		
<b>Assessment Description:</b> Written examination held during final terminal exams examining all learning outcomes			
No Workplace Assessment			
Reassessment Requirement			
<b>Repeat examination</b> <i>Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.</i>			
<b>Reassessment Description</b> Repeat examination Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element. The repeat strategy for this module is an examination. Students will be afforded an opportunity to repeat the examination at specified times throughout the year and all learning outcomes will be assessed in the repeat exam.			

## H8AI: Artificial Intelligence

Module Workload				
Module Target Workload Hours 0 Hours				
Workload: Full Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	Classroom & Demonstrations (hours)	24	Every Week	24.00
Tutorial	Other hours (Practical/Tutorial)	24	Every Week	24.00
Independent Learning	Independent learning (hours)	202	Every Week	202.00
Total Weekly Contact Hours				48.00
Workload: Part Time				
Workload Type	Workload Description	Hours	Frequency	Average Weekly Learner Workload
Lecture	No Description	24	Per Semester	2.00
Tutorial	No Description	36	Per Semester	3.00
Independent Learning	No Description	190	Per Semester	15.83
Total Weekly Contact Hours				5.00

Module Resources	
<i>Recommended Book Resources</i>	
<p>Stuart Russell, Peter Norvig. (2016), Artificial Intelligence, [ISBN: 9781292153964].</p> <p>Hobson Lane, Cole Howard, Hannes Hapke. (2019), Natural Language Processing in Action, Pearson Professional, p.420, [ISBN: 978-1617294631].</p> <p>Dietmar Jannach, Markus Zanker, Alexander Felfernig, Gerhard Friedrich. (2010), Recommender Systems, Cambridge University Press, p.352, [ISBN: 978-0521493369].</p> <p>Timo Koski, John Noble. (2009), Bayesian Networks, Wiley, p.366, [ISBN: 978-0470743041].</p>	
<i>Supplementary Book Resources</i>	
<p>Ian Millington, John Funge. (2009), Artificial Intelligence for Games, CRC Press, p.872, [ISBN: 978-0123747310].</p>	
<i>Recommended Article/Paper Resources</i>	
<p>Gabrani G., Sabharwal S., Singh V.K. (2017), Artificial Intelligence Based Recommender Systems: A Survey, Advances in Computing and Data Sciences, <a href="https://doi.org/10.1007/978-981-10-5427-3_6">https://doi.org/10.1007/978-981-10-5427-3_6</a></p>	
<i>This module does not have any other resources</i>	
Discussion Note:	