H8AI: Artificial Intelligence

Module Code:	H8AI
Long Title	Artificial Intelligence APPROVED
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.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
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.

Dependencies

Module Recommendations

No recommendations listed

Co-requisite Modules

No Co-requisite modules listed

Entry requirements	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
Introduction to Artificial Intelligence Foundations of AI: philosophy, maths, psychology, computing, linguistics, logic, probability theory Historical evolution of the field Weak vs Strong AI Ethical implications of AI
Agents Precepts, actions, goals, environment Rational agents Environments Agent functions and programs Simple reflex agents Reflex agents with state Goal based agents Utility based agents
Search-Based Problem Solving Utility based agents Performance State space search Uninformed Search strategies: Uniform Cost, DeptFirst, Depth-Limited, Iterative Deepening
Reasoning Propositional Logic First Order Logic Inference in First Order Logic
Knowledge Representation Ontological Engineering Categories, objects and events Semantic networks
Bayesian Networks Quantifying Uncertainty Bayes' Rules and its use
Natural Language Processing Language models Retrieval, extraction and classification for natural language processing
Recommender Systems 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

Assessment Type:	Formative Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4
Non-Marked:	Yes		

Assessment Description:
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.

Assessment Type:	Project	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	3,4
Non-Marked:	No		

Assessment Description:
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

Assessment Type:	Terminal Exam	**% of total:**	60
Assessment Date:	End-of-Semester	**Outcome addressed:**	1,2,3,4
Non-Marked:	No		

Assessment Description:
Written examination held during final terminal exams examining all learning outcomes

No Workplace Assessment

Reassessment Requirement

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.

Reassessment Description
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.

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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

Recommended Book Resources

Stuart Russell,Peter Norvig. (2016), Artificial Intelligence, [ISBN: 9781292153964].

Hobson Lane,Cole Howard,Hannes Hapke. (2019), Natural Language Processing in Action, Pearson Professional, p.420, [ISBN: 978-1617294631].

Dietmar Jannach,Markus Zanker,Alexander Felfernig,Gerhard Friedrich. (2010), Recommender Systems, Cambridge University Press, p.352, [ISBN: 978-0521493369].

Timo Koski,John Noble. (2009), Bayesian Networks, Wiley, p.366, [ISBN: 978-0470743041].

Supplementary Book Resources

Ian Millington,John Funge. (2009), Artificial Intelligence for Games, CRC Press, p.872, [ISBN: 978-0123747310].

Recommended Article/Paper Resources

Gabrani G., Sabharwal S., Singh V.K. (2017), Artificial Intelligence Based Recommender Systems: A Survey, Advances in Computing and Data Sciences, https://doi.org/10.1007/978-981-10-5427- 3_6

This module does not have any other resources

Discussion Note:	