Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	COM 757
Module Title	Artificial Intelligence
Level	7
Credit value	20
Faculty	FACE
HECoS Code	100359
Cost Code	GACP
Pre-requisite module	N/A

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
MSc Computer Science	Core
MSc Computer Science with Advanced Practice	Core

Breakdown of module hours

Learning and teaching hours	11 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	10 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**21** hrs
Placement hours	0 hrs
Guided independent study hours	179 hrs
Module duration (Total hours)	200 hrs

Module aims

This module aims to provide students with a deep understanding of advanced concepts, algorithms, and techniques used in artificial intelligence (AI), as well as their ethical and societal implications. Students will develop practical skills in designing and evaluating complex AI systems to solve real-world problems, using advanced programming languages, tools, and frameworks. Through independent research, critical analysis, and effective communication, students will be able to contribute to the knowledge and practice of AI and its applications in various domains.

Module Learning Outcomes

At the end of this module, students will be able to:

1	Design and implement complex AI systems to solve real-world problems, considering ethical and societal implications.
2	Critically evaluate contemporary and emerging AI research and methods.
3	Synthesize and disseminate advanced AI concepts and research to both technical and non-technical audiences.

Assessment

The assessment for this module is designed to evaluate students' understanding of theoretical concepts, their ability to critically analyze AI methodologies, and their communication skills. Students will complete written assignments that involves exploring and evaluating AI theories, frameworks, and models. The assignment will assess their ability to apply theoretical knowledge to real-world scenarios and their proficiency in critically assessing AI literature.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1,2,3	Coursework	100%

Learning and Teaching Strategies

In line with the Active Learning Framework, this module will be blended digitally with both a VLE and online community. Content will be available for students to access synchronously and asynchronously and may indicatively include first and third-party tutorials and videos, supporting files, online activities, and additional learning content.

Indicative Syllabus Outline

• Introduction to Artificial Intelligence: history, types, and applications

• Mathematical Foundations of AI: Linear algebra, Calculus, Probability theory, Statistics

• Machine Learning Algorithms: Supervised, unsupervised, and reinforcement learning; decision trees, support vector machines, neural networks, and deep learning

• Natural Language Processing

• Computer Vision: Image classification, Object detection, Segmentation, Tracking

• Robotics: Control theory, Kinematics, dynamics, Robot perception, Planning, and Control

• AI Evaluation and Impact: Metrics for evaluating AI performance, Ethical and Social considerations

• Reinforcement Learning, Transfer Learning, Generative Models, Multi-agent Systems

Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads:

• S. Russell & P. Norvig, Artificial Intelligence: A Modern Approach, Global Edition, Pearson, 2021.

Other indicative reading:

• C. O'Neil, Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy, Penguin, 2017.

• S. Russell, Human Compatible: Artificial Intelligence and the Problem of Control, Allen Lane, 2019.

• N. Bostrom, Superintelligence: Paths, Dangers, Strategies, OUP Oxford, 2016.

• P. Domingos, The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World, Penguin, 2017.

• G. Kasparov & M. Greengard, Deep Thinking: Where Machine Intelligence Ends and Human Creativity Begins, 2018.

• M. Tegmark, Life 3.0: Being Human in the Age of Artificial Intelligence, Penguin, 2018.

Administrative Information

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Initial approval date	08/11/2023
With effect from date	Sept 2024
Date and details of revision	March 2025 – AM2 change of assessment and LO update
Version number	2