Module Specification

Applied Artificial Intelligence

Version: 2025-26, v1.0, 15 Jun 2023

Contents

Part 1: Information

Module title: Applied Artificial Intelligence

Module code: UFMF31-30-3

Level: Level 6

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module explores the application of artificial intelligence techniques in a range of problem domains that are relevant to mechatronics and other branches of engineering. The defining characteristics of these techniques include learning, pattern recognition and the ability to deal with uncertain and imprecise data.

Features: Not applicable

Educational aims: The aim of the module is to equip students with an interdisciplinary knowledge of classical artificial intelligence, deep learning, psychology, ethology, neuroscience and control such that these can be applied to address uncertainty in contemporary mechatronics problems.

Outline syllabus: •Introduction

oReview links to other disciplines such as classical AI, deep learning, psychology, robotics, ethology/neuroscience and classical control techniques. The scope and limitations of the module with respect to control and AI.

•Learning and adaptive systems

oWorking definitions of intelligence, adaptive systems and learning, emphasising adaptation through learning versus design.

•Fundamental architectures

oNeural networks, Fuzzy systems, Evolutionary computation. Supervised, unsupervised and reinforcement learning.

•Applications

oReview existing industry examples to demonstrate the significant strengths and weaknesses of different techniques.

•State of the art

oReview of research conducted at UWE, Bristol and other establishments to highlight the direction of contemporary research themes in AI and their potential for the future of industrial AI applications.

Part 3: Teaching and learning methods

Teaching and learning methods: Students will be introduced to threshold concepts each week in the first semester through lectorials in which both theory and practice will be consolidated. The second semester will deepen the student's learning through project-based investigation of applied case studies in applied artificial intelligence.

Independent learning includes hours of essential reading and laboratory-based development work outside the scheduled classes.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Compare and evaluate artificial intelligence techniques suitable for application in mechatronics.

MO2 Design and apply artificial intelligence to real-world mechatronics problems and critically reflect on performance and scope.

MO3 Conduct an artificial intelligence-based research project and present the process and outcomes.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/items/0e2fa73e-4f84-4633-8c6d-33843e27236f.html?lang=en&login=1

Part 4: Assessment

Assessment strategy: Assessment of this module (for both sit and resit) consists of the following:

Examination (Online)

A written examination will assess the student's understanding of the core theories and techniques of AI that are applicable to the domain.

Presentation

Presentation#1 (15-minute) summarising each student's initial research to identify a relevant aspect of AI and how they will apply and analyse performance in the project work.

Presentation#2 (15-minute) demonstration of each student's findings from their practical investigation.

Written Assignment

Students will be required to conduct a project on AI applications including the design and development details. The written assignment must include the artefact developed to demonstrate the results.

Assessment tasks:

Examination (Online) (First Sit)
Description: Examination (Online)
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1

Presentation (First Sit)
Description: Presentation#1 (15-minute) summarising each student's initial research to identify a relevant aspect of AI and how they will apply and analyse performance in the project work.

Presentation#2 (15-minute) demonstration of each student's findings from their practical investigation.
Weighting: 20 %
Final assessment: No
Group work: No

Learning outcomes tested: MO2, MO3

Written Assignment (First Sit)
Description: Students will be required to conduct a project on AI applications including the design and development details. The written assignment must include the artefact developed to demonstrate the results.
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3

Examination (Online) (Resit)
Description: Examination (Online)
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1

Presentation (Resit)
Description: Presentation#1 (15-minute) summarising each student's initial research to identify a relevant aspect of AI and how they will apply and analyse performance in the project work.

Presentation#2 (15-minute) demonstration of each student's findings from their practical investigation.
Weighting: 20 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3

Written Assignment (Resit)
Description: Students will be required to conduct a project on AI applications including the design and development details. The written assignment must include the artefact developed to demonstrate the results.

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechatronics Engineering [Frenchay] MEng 2023-24

Mechatronics Engineering [Frenchay] BEng (Hons) 2023-24