**Module Specification**

Artificial Intelligence I

Version: 2023-24, v3.0, 16 Jan 2023

**Contents**

# Part 1: Information

**Module title:** Artificial Intelligence I

**Module code:** UFCFGS-15-1

**Level:** Level 4

**For implementation from:** 2023-24

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Environment & Technology

**Department:** FET Dept of Computer Sci & Creative Tech

**Partner institutions:** None

**Field:** Computer Science and Creative Technologies

**Module type:** Module

**Pre-requisites:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** No

**Professional, statutory or regulatory body requirements:** None

# Part 2: Description

**Overview:** This module will introduce students to the fundamental concepts of modern Artificial Intelligent based systems, the underpinning paradigms, and the ethical and wider context within which they operate.

**Features:** Not applicable

**Educational aims:** This module aims to give the students underpinning knowledge and skills in AI techniques and the vocabulary used to describe them. It also aims to promote a consideration of the ethical issues that arise from their use.

**Outline syllabus:** What is AI?

Different types of problems (optimisation, modelling, prediction) and how they relate to forms of logic abduction/induction/deduction

Ethics of AI: - examples of problems (e.g. discrimination) and also 'hype'

Knowledge Representation: human provided models

rules/facts, e.g. expert system rules, "rule engines", scripted NPCs, simple chatbot

Machine Learning:

Unsupervised & reinforcement learning.

Supervised learning:

 Process of model induction: training, and test sets

  Different forms of models and their strengths/weaknesses: e.g.

  Greedy rule induction,

  MLP with Backprop

Search, and the concept of representations as an abstraction of the real world allowing the use of standard algorithms (3 weeks).

Constructive vs perturbative search

Completeness, optimality, introduce idea of landscapes,

Simple Hill Climber (relating to greedy search in the ML algorithms studied above)

Dijkstra and A* for route planning

# Part 3: Teaching and learning methods

**Teaching and learning methods:** The timetabled sessions will include:

Lectures to introduce basic concepts and problem specs. Where appropriate, industry speakers will be invited to illuminate the concepts from their perspective.

Tutorials / Lab sessions in which you will work on a number of practical projects gaining hands-on experience of the techniques introduced in the lectures. Example

projects include:

A Chatbot (i.e., human provided knowledge base);

A simple rule induction algorithm for a machine learning problem;

A* for a pathfinding application (e.g. a NPC controller in a game)

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

**MO1** Apply the basic concepts, uses and processes of AI to new tasks, identifying: the type of problem; what technologies or algorithms would be appropriate to apply; and suitable representations for candidate solutions. (Assessed in Component A)

**MO2** Recognise the differences between "Knowledge-based" paradigms of AI (inspired by the mind) and "Computational Intelligence" (e.g. inspired by the brain), and select appropriate paradigms according to the needs of a specific problem or application. (Assessed in Component A)

**MO3** Identify potential legal and ethical issues - such as privacy and unintentional bias- associated with the deployment of AI-based systems, and suggest actions to mitigate undesirable effects. (Assessed in Component A)

**MO4** Design and implement basic optimisation, expert system and machine learning systems.  (Assessed in Component B)

**Hours to be allocated:** 150

**Contact hours:**

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

**Reading list:** The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/lists/3E2EB393-DBA8-2DB6-2F00-BCA5939FED2D.html


# Part 4: Assessment

**Assessment strategy:** The learning outcomes will be formally assessed through a portfolio of activities.

The module is divided into topics (Knowledge-based Systems, Machine Learning, Search and Optimisation).

Associated with each topic will be one or more  portfolio elements. These might include, for example, a file of python code  building on work done in the weekly practical sessions,
or a short online test  to confirm your knowledge and understanding of techniques.

Most of the portfolio elements will taken the form of on-line submissions to an automated marking system  to allow feedback to be easily and automatically provided.

The resit attempt will be assessed in the same way as the first attempt

To build confidence, weekly lab-sessions, and end-of-topic 'reflection' sessions will provide the opportunity for informal feedback and discussions.
In addition, weekly formative self-assessments tests on Blackboard will let students check their understanding of materials and receive detailed feedback in their own time.

**Assessment tasks:**

**Portfolio** (First Sit)
Description: Portfolio of tasks associated with the module topics.
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

**Portfolio** (Resit)

Description: Portfolio of tasks associated with the module topics.

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

## Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science [Phenikaa] BSc (Hons) 2023-24

Computer Science [Frenchay] BSc (Hons) 2023-24

Computer Science (Artificial Intelligence) [NepalBrit] BSc (Hons) 2023-24

Computer Science [Villa] BSc (Hons) 2023-24

Computing {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2022-23

Computing {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2022-23

Computer Science {Foundation} [Frenchay] BSc (Hons) 2022-23

Computer Science {Foundation} [GCET] BSc (Hons) 2022-23

Computer Science (Smart Devices) {Foundation} [GCET] BSc (Hons) 2022-23

Computer Science (Artificial Intelligence) {Foundation} [GCET] BSc (Hons) 2022-23