



Module Specification

Artificial Intelligence I

Version: 2021-22, v1.0, 17 Jun 2020

Contents

Module Specification	1
Part 1: Information	2
Part 2: Description	2
Part 3: Teaching and learning methods	3
Part 4: Assessment.....	5
Part 5: Contributes towards	7

Part 1: Information

Module title: Artificial Intelligence I

Module code: UFCFGS-15-1

Level: Level 4

For implementation from: 2021-22

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

Delivery locations: Frenchay Campus

Field: Computer Science and Creative Technologies

Module type: Standard

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:

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](https://uwe.rl.talis.com/lists/3E2EB393-DBA8-2DB6-2F00-BCA5939FED2D.html) 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 mixture of short in-class tests, and one coursework element composed of a set of deliverables.

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

Associated with each topic will be:

- a coursework deliverable building on work done in the weekly practical sessions.
- a short in-class test (typically of 30 minutes duration), to confirm your knowledge and understanding of techniques you have applied in your coursework.

Both the coursework deliverables and the in-class tests will taken the form of on-line submissions to an automated marking system (e.g. DEWIS or Blackboard tests) to allow feedback to be easily and automatically provided.

Typically each coursework deliverable will involve submitting:

- one or more pieces of source code solving a specified problem relevant to the topic (such as the examples above).
- a series of multiple choice/multiple answer questions about the practical, legal and ethical issues surrounding the techniques implemented, and their possible use as part within a larger system.

The resit attempt will be assessed in the same way as the first attempt, except that there will only be one in-class test.

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 you check your understanding of materials and receive detailed feedback in your own time.

Assessment components:**In-class test - Component A (First Sit)**

Description: In-class test: typically 3 of 30 minutes duration each .

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Online Assignment - Component B (First Sit)

Description: Individual Coursework composed of three deliverables, submitted to an online system (typically DEWIS) for automatic marking and provision of feedback.

Submission 1 – source code and answers to a set of questions concerning Knowledge-Based Systems

Submission 2 –source code and answers to a set of questions concerning machine learning.

Submission 2 –source code and answers to a set of questions concerning optimisation algorithms.

Weighting: 75 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

In-class test - Component A (Resit)

Description: In-class test: typically 90 minutes duration.

Weighting: 25 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Online Assignment - Component B (Resit)

Description: Individual Coursework composed of three deliverables, submitted to an online system (typically DEWIS) for automatic marking and provision of feedback.

Submission 1 – source code and answers to a set of questions concerning Knowledge-Based Systems

Submission 2 –source code and answers to a set of questions concerning machine learning.

Submission 2 –source code and answers to a set of questions concerning optimisation algorithms.

Weighting: 75 %

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 [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Computer Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2021-22

Computer Science [Sep][FT][Villa][3yrs] BSc (Hons) 2021-22

Computer Science [Jan][FT][Villa][3yrs] BSc (Hons) 2021-22

Computer Science [May][FT][Villa][3yrs] BSc (Hons) 2021-22

Computing {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Computing {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2020-21

Computer Science {Foundation}[Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Computer Science {Foundation}[Sep][SW][Frenchay][5yrs] BSc (Hons) 2020-21