1. KentVision Code and title of the module

COMP5280 Introduction to Artificial Intelligence

## Division and School/Department or partner institution which will be responsible for management of the module

Division of Computing, Engineering, Mathematical Sciences (CEMS)

School of Computing

## The level of the module (Level 4, Level 5, Level 6 or Level 7)

Level 5

## The number of credits and the ECTS value which the module represents

15 credits (7.5 ECTS)

## Which term(s) the module is to be taught in (or other teaching pattern)

Autumn or Spring

## Prerequisite and co-requisite modules and/or any module restrictions

Pre-requisite: COMP5200: Further Object-Oriented Programming

or COMP5230: Fundamentals of Programming and Logic

or COMP3590: Programming for Artificial Intelligence

## The course(s) of study to which the module contributes

BSc Computer Science, including all variants, both with and without Year in Industry.

BSc Artificial Intelligence, BSc Data Science, BSc Computing, both with and without Year in Industry.

BSc Software Engineering, both with and without Year in Industry

BSc Business Information Technology, both with and without Year in Industry

## The intended subject specific learning outcomes.On successfully completing the module students will be able to:

8.1 Explain the motivation for designing intelligent machines, their implications and associated philosophical issues, such as the nature of intelligence and learning.

8.2 Describe and apply the main kinds of state-space search algorithms, considering their strengths and limitations.

8.3 Explain the main concepts and principles associated with different kinds of knowledge representation, such as logic, case-based representations, and subsymbolic/connectionist representations.

8.4 Explain the differences between the major kinds of machine learning problems – namely supervised learning, unsupervised learning and reinforcement learning – and describe and implement the basic ideas of algorithms for solving those problems.

8.5 Describe the main concepts and principles of major kinds of biologically-inspired algorithms, and understand and implement one such technique.

8.6 Describe how various intelligent-system techniques have been used in the context of several case studies, and compare different techniques in the context of those case studies.

## The intended generic learning outcomes.On successfully completing the module students will be able to:

9.1 Discuss and give examples of the role of analogy and metaphor in science and engineering;

9.2 apply mathematical and computational skills in solving problems;

9.3 compare different strategies for problem solving, choose a strategy and justify that choice;

9.4 assess the strengths and weaknesses of hypotheses and techniques;

9.5 use the library and appropriate internet resources in support of learning.

## A synopsis of the curriculum

This module covers the principles of machine learning and the kinds of problems that can be solved by such techniques. You learn about the philosophy of AI, how knowledge is represented and algorithms to search state spaces. The module also provides a detailed introduction to both machine learning and biologically inspired computation.

## Reading list

S.J. Russell & P. Norvig, “Artificial Intelligence: A modern approach”, 2nd Edition. Prentice-Hall, 2002. (main textbook)

S. Pinker. “How the Mind Works”, W.W. Norton & Company, 1999.

A. Cawsey, “The Essence of Artificial Intelligence”, Prentice-Hall, 1998.

P. Bentley. “Digital Biology”, Simon & Schuster, 2002

R.L. Haupt & S.E. Haupt, “Practical Genetic Algorithms”, 2nd edition, Wiley, 2004.

S. Haykin, “Neural Networks and Learning Machines”, 3rd Edition. Pearson, 2009.

## Contact Hours

Total contact hours: 28

Private study hours: 122

Total study hours: 150

## Assessment methods

* 1. Main assessment methods

A1 – Practical assignment (25%) (15 hours)

A2 – Practical assignment (25%) (15 hours)

2 hour unseen written examination (50%)

13.2 Reassessment methods

Like for like.

## Map of module learning outcomes (sections 8 & 9) to learning and teaching methods (section 12) and methods of assessment (section 13)

**Module learning outcomes against learning and teaching methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 8.6 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Private Study** |  |  |  |  |  | x | x | x | x | x | x |
| *Lectures* | x | x | x | x | x | x | x |  | x |  |  |
| *Classes* |  | x |  | x | x |  |  | x | x | x | x |

**Module learning outcomes against assessment methods:**

| **Module learning outcome** | 8.1 | 8.2 | 8.3 | 8.4 | 8.5 | 8.6 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Coursework* | x | x | x | x | x | x | **x** | x | **x** | x | x |
| *Examination* | x | x | x | x | x | x | x | **x** | x | **x** |  |

## Inclusive module design

The Division recognises and has embedded the expectations of current equality legislation, by ensuring that the module is as accessible as possible by design. Additional alternative arrangements for students with Inclusive Learning Plans (ILPs)/declared disabilities will be made on an individual basis, in consultation with the relevant policies and support services.

The inclusive practices in the guidance (see Annex B Appendix A) have been considered in order to support all students in the following areas:

a) Accessible resources and curriculum

b) Learning, teaching and assessment methods

## Campus(es) or centre(s) where module will be delivered

Canterbury

## Internationalisation

The topics addressed by this module relate to a field which is of international importance, given the global role of computers in today's technological innovation.
The topics covered by this module are international in nature, being identical worldwide and independent of traditional spoken language.

**If the module is part of a course in a Partner College or Validated Institution, please complete sections 18 and 19. If the module is not part of a course in a Partner College or Validated Institution these sections can be deleted.**

## Partner College/Validated Institution

## University Division responsible for the course

**DIVISIONAL USE ONLY**

**Module record – all revisions must be recorded in the grid and full details of the change retained in the appropriate committee records.**

| Date approved | New/Major/minor revision | Start date of delivery of (revised) version | Section revised(if applicable) | Impacts PLOs (Q6&7 cover sheet) |
| --- | --- | --- | --- | --- |
| 10/11/2020 | Minor |  | 6, 7, 8, 9 | No |
| 01/12/2021 | Major | 2022/23 | 8,9,11,14 | No |
| 16/12/2022 | Minor | September 2023 | 7,13 | No |