### Aims

Traditional computation finds it either difficult or impossible to perform a certain key range of tasks associated with pattern recognition, problem solving and autonomous intelligence. Great progress towards designing software for such tasks has emerged by taking inspiration from a range of natural, mainly biological, systems.

The aims of this course are to:
- introduce an appreciation of the former
- introduce the main biologically-inspired algorithms and techniques which are now commonly researched and applied
- establish a practical understanding of the real-world problems to which these techniques may be fruitfully be applied.

### Syllabus

- classical vs. biologically-inspired computation.
- evolutionary algorithms (basic EA design, and how they are applied to a wide range of problems)
- swarm intelligence (ant colony methods, particle swarm optimisation)
- neural computation (perceptrons, multilayer perceptrons, associative networks)
- cellular automata
## 17. Learning Outcomes (HWU Core Skills: Employability and Professional Career Readiness)

### Subject Mastery

**Understanding, Knowledge and Cognitive Skills**

- Understanding of limitations of traditional computation.
- A critical understanding of a range of biologically inspired computation methods, their limitations and areas of applicability.
- Ability to apply one or more biologically inspired techniques in solving a practical problem.

**Scholarship, Enquiry and Research (Research-Informed Learning)**

### Personal Abilities

**Industrial, Commercial & Professional Practice**

- Autonomy, Accountability & Working with Others

- Communication, Numeracy & ICT

- Identify and define approaches that can be used to apply bio-inspired methods to existing problems in optimisation and machine learning.
- Exercise substantial autonomy and initiative (courseworks) (PDP)
- Demonstrate critical reflection (courseworks) (PDP).

## 18. Assessment Methods

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<th>Method</th>
<th>Duration of Exam (if applicable)</th>
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## 19. Re-assessment Methods

## 20. Date and Version

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