Module Title: Artificial Intelligence and Intelligent Agents

School: Mathematical & Computer Sciences

Module Co-ordinator: Ruth Aylett, Lilia Georgieva

Module Code: F29AI

Semester: 1

Credits: 15

1. Pre-requisites
   Elementary knowledge of logic at the level of undergraduate Computer Science. Knowledge of high-level programming language concepts.

2. Linked Modules
   None

3. Excluded Modules
   None

4. Replacement Module
   Code: 
   Date Of Replacement: 

5. Availability as an Elective
   Yes [ ] No [√]

6. Degrees for which this is a core module
   Mandatory module for BSc in Computer Science & MEng in Software Engineering, MSc in Intelligent Web Technology, MSc in Bioinformatics.
   Optional module for MSc IT (software systems), MSc Distributed & Multimedia Information Systems, MSc intelligent Systems, MSc Artificial intelligence, MSc Creative Software Systems

7. Aims
   ♦ To introduce the fundamental concepts and techniques of AI, including planning, search and knowledge representation
   ♦ To introduce the scope, subfields and applications of AI, topics to be taken from a list including natural language processing, expert systems, robots and autonomous agents, machine learning and neural networks, and vision.
   ♦ To develop skills in AI programming in an appropriate language

8. Syllabus
   ♦ Search algorithms (depth first search, breadth first search, uniform cost search, A* search)
   ♦ constraint satisfaction problems;
   ♦ games (min-max, alpha-beta pruning);
   ♦ logic, resolution, introductory logic programming
   ♦ knowledge representation – logic, rules, frames
   ♦ goal and data-driven reasoning
   ♦ practical rule-based programming
   ♦ Overview of main fields of AI (Vision, Learning, Knowledge Engineering)
   ♦ In depth view of one field of AI (e.g. Planning, Natural language)
   ♦ Autonomous agents
   ♦ Applications of AI
   ♦ AI programming
## 9. Learning Outcomes (HWU Core Skills: Employability and Professional Career Readiness)

### Subject Mastery

**Understanding, Knowledge and Cognitive Skills** | **Scholarship, Enquiry and Research (Research-Informed Learning)**
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- Critical understanding of traditional AI problem solving and knowledge representation methods
- Use of knowledge representation techniques (such as predicate logic and frames).
- Critical understanding of different systematic and heuristic search techniques
- Practice in expressing problems in terms of state-space search
- Broad knowledge and understanding of the subfields and applications of AI, such as computer vision, machine learning and expert systems.
- Detailed knowledge of one subfield of AI (e.g. natural language processing, planning) and ability to apply its formalisms and representations to small problems
- Detailed understanding of different approaches to autonomous agent and robot architectures, and the ability to critically evaluate their advantages and disadvantages in different contexts.
- Practice in the implementation of simple AI systems using a suitable language

### Personal Abilities

**Industrial, Commercial & Professional Practice** | **Autonomy, Accountability & Working with Others** | **Communication, Numeracy & ICT**
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- Identification, representation and solution of problems
- Time management and resource organisation
- Research skills and report writing
- Practice in the use of ICT, numeracy and presentation skills

## 10. Assessment Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Duration of Exam (if applicable)</th>
<th>Weighting (%)</th>
<th>Synoptic modules?</th>
<th>Method</th>
<th>Duration of Exam (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam</td>
<td>2 hours</td>
<td>70%</td>
<td></td>
<td>Exam</td>
<td>2 hours</td>
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<tr>
<td>Coursework</td>
<td></td>
<td>30%</td>
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## 11. Re-assessment Methods

- Exam
- Coursework

## 12. Date and Version

- **Date of Proposal**: 12/10/2007
- **Date of Approval by School Committee**: December 2007
- **Date of Implementation**: 15/9/2008
- **Version Number**: 1.0