PH3C5-15 Philosophy of Computing and Artificial Intelligence

26/27

Department
Philosophy
Level
Undergraduate Level 3
Module leader
Walter Dean
Credit value
15
Module duration
10 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

The purpose of this module is to provide a non-technical introduction to computer science and philosophical issues about computation and artificial intelligence. Among the questions we will address are the following: What is computation? What is an algorithm? What is computational complexity? Are all problems solvable by algorithms? What does it mean for a physical system to compute? What is the role of computation in mathematics and the sciences? What is the role of computation in society? What is meant by "intelligence" and "artificial intelligence"? What prospects and challenges are posed by specific developments in artificial intelligence (e.g. machine learning, large language models)?

Module aims

The module has three goals:

1. To equip students with a basic knowledge of computer science both as an academic discipline both in its own right and in regard to other disciplines -- e.g. mathematics, the physical and social sciences.
2. To illustrate how computer science interacts with traditional philosophical debates -- e.g.

What sort of physical processes count as computation? Can a computer be conscious or a moral agent?

3. To help students understand on this basis the increasing role of computation in daily life outside of academia -- e.g. encryption, privacy, surveillance, the role of algorithms in law, public policy, electoral systems, evolving practical ramifications of artificial intelligence.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

- Week 1: Introduction: Computer science and artificial intelligence as disciplines
- Week 2: Algorithms, programs, correctness
- Week 3: Complexity, intractability, and non-computability
- Week 4: Machines, computation, and physics
- Week 5: Computation and mathematics
- Week 7: Computation and society
- Week 8: Artificial intelligence I: History and the logical paradigm
- Week 9: Artificial intelligence II: Machine learning and the statistical paradigm
- Week 10: Artificial intelligence III: safety, ethics, existential risks, the future

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate knowledge of central topics in the philosophy of computation and artificial intelligence. (Subject knowledge and understanding.)
- Understand the significance that questions in philosophy of computation and artificial intelligence have to wider issues in philosophy, mathematics, the sciences. (Cognitive skills)
- Articulate their own view of the relative merits of different theories and engage critically with the arguments put forward in support of them (key skills).
- Show an understanding of methodological issues in the philosophy of mathematics, and of questions of demarcation between philosophy and mathematics (subject-specific skills)

Indicative reading list

Reading lists can be found in Talis

Subject specific skills

Show an understanding of methodological issues in the philosophy of computation and artificial intelligence, and of questions of demarcation between philosophy and computer science.

Transferable skills

Understanding of how development in computer science and artificial intelligence bear on

traditional topics in philosophy (e.g. the nature of the mind and consciousness), other academic disciplines (e.g. mathematics, the physical and social sciences) and contemporary debates outside of academia (e.g. in regard to privacy, the use of algorithms and machine learning in public policy, the workplace, surveillance, ethics, safety, and existential risk in regard to artificial intelligence).

Study

Study time

Type	Required
Lectures	9 sessions of 2 hours (12%)
Seminars	8 sessions of 1 hour (5%)
Private study	124 hours (83%)
Total	150 hours

Private study description

No private study requirements defined for this module.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group A2

	Weighting	Study time	Eligible for self-certification
Project	20%		No
The project may take the form of either a review of recent literature, a self-contained presentation of technical results or developments, or a computer-based implementation with accompanying textual description.			
Essay	80%		Yes (extension)

Assessment group R1

	Weighting	Study time	Eligible for self-certification
3000 word essay	100%		Yes (extension)

Feedback on assessment

Written feedback on projects and essays.

Availability

Courses

This module is Core optional for:

- UMAA-GV17 Undergraduate Mathematics and Philosophy
  - Year 3 of GV17 Mathematics and Philosophy
  - Year 3 of GV17 Mathematics and Philosophy
  - Year 3 of GV17 Mathematics and Philosophy
- UMAA-GV18 Undergraduate Mathematics and Philosophy with Intercalated Year
  - Year 4 of GV18 Mathematics and Philosophy with Intercalated Year
  - Year 4 of GV18 Mathematics and Philosophy with Intercalated Year

This module is Optional for:

- UPHA-VL78 BA in Philosophy with Psychology
  - Year 2 of VL78 Philosophy with Psychology
  - Year 3 of VL78 Philosophy with Psychology
  - Year 3 of VL78 Philosophy with Psychology
- UHIA-V1V5 Undergraduate History and Philosophy
  - Year 2 of V1V5 History and Philosophy
  - Year 3 of V1V5 History and Philosophy
- Year 4 of UHIA-V1V6 Undergraduate History and Philosophy (with Year Abroad)
- UMAA-G100 Undergraduate Mathematics (BSc)
  - Year 3 of G100 Mathematics
  - Year 3 of G100 Mathematics
  - Year 3 of G100 Mathematics
- UMAA-G103 Undergraduate Mathematics (MMath)
  - Year 3 of G100 Mathematics
  - Year 4 of G103 Mathematics (MMath)
  - Year 4 of G103 Mathematics (MMath)
- UMAA-GV17 Undergraduate Mathematics and Philosophy
  - Year 2 of GV17 Mathematics and Philosophy
  - Year 2 of GV17 Mathematics and Philosophy
  - Year 2 of GV17 Mathematics and Philosophy
- UMAA-GV19 Undergraduate Mathematics and Philosophy with Specialism in Logic and Foundations

    - Year 2 of GV19 Mathematics and Philosophy with Specialism in Logic and Foundations
    - Year 3 of GV19 Mathematics and Philosophy with Specialism in Logic and Foundations
    - Year 4 of GV19 Mathematics and Philosophy with Specialism in Logic and Foundations
- UPHA-V700 Undergraduate Philosophy
    - Year 2 of V700 Philosophy
    - Year 2 of V700 Philosophy
    - Year 3 of V700 Philosophy
    - Year 3 of V700 Philosophy
    - Year 3 of V700 Philosophy
    - Year 3 of V700 Philosophy
- Year 4 of UPHA-V701 Undergraduate Philosophy (wiith Intercalated year)
- UIPA-V5L8 Undergraduate Philosophy and Global Sustainable Development
    - Year 2 of V5L8 Philosophy and Global Sustainable Development
    - Year 2 of V5L8 Philosophy and Global Sustainable Development
    - Year 3 of V5L8 Philosophy and Global Sustainable Development
    - Year 3 of V5L8 Philosophy and Global Sustainable Development
- Year 4 of UIPA-V5L9 Undergraduate Philosophy and Global Sustainable Development (with Intercalated Year)
- UPHA-VQ72 Undergraduate Philosophy and Literature
    - Year 2 of VQ72 Philosophy and Literature
    - Year 3 of VQ72 Philosophy and Literature
- Year 4 of UPHA-VQ74 Undergraduate Philosophy and Literature (with Work Placement)
- Year 4 of UPHA-VQ73 Undergraduate Philosophy and Literature with Intercalated Year
- Year 4 of UPHA-VL80 Undergraduate Philosophy with Psychology (with Work Placement)
- UPHA-VQ52 Undergraduate Philosophy, Literature and Classics
    - Year 2 of VQ52 Philosophy, Literature and Classics
    - Year 3 of VQ52 Philosophy, Literature and Classics
- Year 4 of UPHA-VQ53 Undergraduate Philosophy, Literature and Classics (with Work Placement)
- UPHA-V7ML Undergraduate Philosophy, Politics and Economics
    - Year 2 of V7MR Philosophy, Politics and Economics (Bipartite with Economics Major)
    - Year 2 of V7MR Philosophy, Politics and Economics (Bipartite with Economics Major)
    - Year 2 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 2 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 2 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 2 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
    - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
    - Year 2 of V7ML Philosophy, Politics and Economics (Tripartite)
    - Year 3 of V7MR Philosophy, Politics and Economics (Bipartite with Economics Major)
    - Year 3 of V7MR Philosophy, Politics and Economics (Bipartite with Economics Major)
    - Year 3 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 3 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 3 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 3 of V7MP Philosophy, Politics and Economics (Bipartite)
    - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)

    - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)
    - Year 3 of V7ML Philosophy, Politics and Economics (Tripartite)
- UPHA-V7MW Undergraduate Politics, Philosophy and Law
    - Year 2 of V7MW Politics, Philosophy and Law
    - Year 2 of V7MW Politics, Philosophy and Law
    - Year 3 of V7MW Politics, Philosophy and Law
    - Year 3 of V7MW Politics, Philosophy and Law