Course Guide

PHIL 10134 The Computational Mind

Course Organiser: Dr. Mazviita Chirimuuta (m.chirimuuta@ed.ac.uk)

- Office hours: Tuesday 10.00-11.00 and Wednesday 13.00-14.00, or by appointment

Course Secretaries

- UG: Ann-Marie Cowe (Annmarie.cowe@ed.ac.uk)
- PG: Becky Verdon (Rebecca.Verdon@ed.ac.uk)

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1. Course Topic and Objectives

Computation is the dominant approach to explaining how the mind works within psychology and neuroscience. Artificial intelligence also now holds out the promise of recreating human-like mental capacities in computing machines. To many, this suggests that cognition (thought, perception, even emotion) is a kind of computation. In this course we will explore philosophical background to the computational approach to the mind, centering our study around two questions:

Computers compute, but do they think? (weeks 1-6)
and Is your brain a computer? (weeks 8-12)

By the end of the course you should be able to:
1. Understand the basic concepts at play in the computational theory of mind.
2. Give informed assessments of claims made about the thought-like nature of computational processes.
3. Explicate and develop well reasoned arguments for and against the claim that the brain is a kind of computer.

2. Assessment Structure

- Midterm 1500 Words (40%)
- Final 2500 Words (55%)
- Participation (5%)

Deadlines
- Midterm: 29th October
- Final: 10th December

3. Content and Readings

Recorded lectures and homework will be posted for each week. Completion of homework will ensure full marks on the participation component of your final grade.

For each week, readings are listed below. Readings include core and secondary readings. The core readings for each week are starred (*).

Core readings are the material that it is your responsibility to read before each class.

Core readings are also the material on which our weekly tutorial discussions will be based. Please do delve into the further reading too - these should be your first port of call when writing your essay. The core readings and as many as possible of the secondary readings are posted as PDFs on Learn.
Some hints: Read the core readings carefully. You may find an article challenging or difficult—persist! If you do not understand something, read it again, think about it, try to make sense of it in your own words. If after multiple attempts to make sense of a passage, you still cannot, then there is a good chance that you have identified a real problem in the article—a perfect point to raise in your discussion forum, in the class, or to form the basis of an excellent essay! Jim Pryor has some wonderful tips for reading philosophy (as he says, you should expect to read a philosophy article more than once).

Background reading
The more background you know the better. A good starting point is to read one of the books listed below. Even if you already have a strong background in this topic already, I would encourage you to read one of these books during the semester to consolidate your knowledge.


And for more advanced readings:

Part I: Computers Compute, but do they Think?

Week 1: Introduction to the Computational Theory of Mind (CTM)
* G. Piccinini and O. Shagrir 2014 Foundations of Computational Neuroscience


Week 2: Origins of the CTM – Turing Machines and Defining Computation

*One of the following:
  • Haugeland, J. “Automatic Formal Systems chapter 2, Artificial Intelligence: The Very Idea
Week 3: Functionalism and Behaviourism

*Turing, A. 1950 “Computing Machinery and Intelligence” Mind, 59 (236) pp. 433-460


Week 4: Implementation

*M. Sprevak 2018 “Triviality arguments” in Sprevak and Colombo (eds.) The Routledge Handbook of the Computational Mind

Week 5: Representations
* Brooks, R. 1991 “Intelligence without representation” Artificial Intelligence 47:139-159


Week 6: The Only Game in Town?


Week 7: Reading, Investigating, and Thinking Week

Part II: Is Your Brain a Computer?

Week 8: Scientific Modelling – Analogy, Abstraction and Idealisation
* Potochnik, A. 2017 chapter 1 Idealization and the Aims of Science. Chicago University Press
* Hesse, M. 1961 “Models” in Chapter 1 Forces and Fields pp. 21-28

Reconstructing Reality: Models, Mathematics, and Simulations Oxford University Press

Week 9: The Machine-Organism Comparison, Historically Considered


Week 10: Marr’s levels of explanation


Week 11: Computational Explanation in Neuroscience

**Week 12: Brain-Like Computation: Connectionism and Deep Learning**

* R. Cao and D. Yamins “Making sense of mechanism: How neural network models can explain brain function.”