

INF1-CG Course Descriptor update

Summary

This course is designed as a first introduction to Cognitive Science. It will provide a selective but representative overview of the subject, suitable for all interested students, including students on the Cognitive Science degrees and external students.

The aim of the lecturing team is to present a unified view of the field, based on a computational approach to analysing cognition. The material is organized by cognitive function (e.g., language, vision), rather than by subdiscipline (e.g., psychology, neuroscience).

The course covers language, vision and attention, memory, motor control and action, and reasoning and generalization. All topics will be presented from a computational point of view, and this perspective will be reinforced by lab sessions in which students use implementations of cognitive models. The course will also provide a basic grounding in the methods of Cognitive Science, focusing on computational modelling and experimental design.

Course Description

The syllabus covers the following topics. They are listed separately here, but in some cases they will be presented in an interleaved fashion:

1. Language

- the language faculty
- models of linguistic data, words and rules theory
- Connectionist models of language
- language acquisition: speech segmentation, word learning, learning syntactic categories
- categorization and models of word meaning
- understanding sentences

2. Vision

- the anatomy of vision, neural correlates of visual perception
- Marr's model
- fine vs. coarse coding
- face recognition
- reading

3. Memory and Attention

- types of memory, memory impairments, models of memory
- attention, neglect

4. Cognition and neuroscience

- an introduction to cognitive neuroscience
- some philosophical perspectives on the brain

5. Reasoning and generalization

- inductive reasoning
- fallacies and (ir)rationality
- models of abstraction and generalisation
- theory formation and the origins of knowledge

Note that this course is intended to give a high-level introduction to the topics listed; subsequent courses (e.g., Cognitive Modeling) will then provide a more detailed coverage.

Additional Information (Assessment)

There will be three assessed assignments in this course, these will combine:

- practical exercises in which students are provided with implemented cognitive models they have to explore and modify;
- essay questions in which students analyze empirical or conceptual problems in cognitive science.

The practical exercises will be supported by lab sessions in which students learn how to use implemented cognitive models. Where possible, the assignments will employ pre-existing modeling tools (e.g., neural network simulators, probabilistic modeling tools).

The essay questions will be supported by tutorials in which students are able to clarify and discuss the materials covered in the lectures.

Learning and Teaching activities

Total Hours: 200 (Lecture Hours 30, Seminar/Tutorial Hours 10, Supervised Practical/Workshop/Studio Hours 10, Summative Assessment Hours 2, Programme Level Learning and Teaching Hours 4, Directed Learning and Independent Learning Hours 144)

Reading List

<http://www.inf.ed.ac.uk/teaching/courses/inf1-cg/reading.html>