

Syllabus for COMP 47230: Introduction to Cognitive Science (Graduate Module)

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This module is taught to MSc students from a variety of programmes, including cognitive science, human computer interaction, consciousness and embodiment, and computer science. It will be taught face to face, but the content of the lectures is provided in video form. Students are required to watch specific videos, and to read specific texts *before class*.

1 Classes

Class will take place from 11:00 to 13:00 on Mondays in A106 in the Arts building. Class will be discussion focussed, on the assumption that students have watched and read the required content. This syllabus only lists required reading and viewing. Further optional resources are provided at the course webpage.

During class, you are free to bring any questions or topics to the discussion. If you have specific questions or topics you would like to raise, you may also email those concerns to me before class and I will ensure that they get discussed.

2 Office hours

I will be on campus on Mondays during teaching term. I am happy to meet for face to face discussions in my office, which is Room A1.11 on the first floor of the Computer Science building. To avoid waiting, it is best to schedule a meeting, but you are welcome to drop by on the fly if you like. To schedule a zoom chat at any other time, please email me.

3 Required viewing and reading, by week

All videos and reading may be accessed through this website:

https://cogsci.ucd.ie/wordpress/?page_id=345

You should bookmark this website. We will use Brightspace only for assignment submission.

- **Week 1, Sept. 11th**
History of Cognitive Science, 1/2

- Video 1: The contested territory of cognition
- Video 2: Looking back to ancient Greece: Heraclitus and Parmenides
- Additional material:
 - * Watch the short video on Heraclitus and Parmenides (3 minutes)
- Video 3: Descartes and the mechanistic worldview
- Video 4: The mental/physical opposition
- Video 5: The British empiricists

• **Week 2, Sept 18th**

History of Cognitive Science, 2/2

- Video 6: The origins of scientific psychology
- Video 7: Early approaches, including psychophysics
- Video 8: Introspection, psychoanalysis
- Video 9: Behaviourism
- Additional material:
 - * Read the paper on Skinner's superstitious pigeons (7 pages)
 - * Watch the video about John Watson's form of behaviourism (6 minutes)
- Video 10: The cognitive turn
- Additional material:
 - * Watch the video about how brains and computers came to be associated (48 minutes)
- Video 11: Connectionism, embodiment
- Additional material:
 - * Read the self-description of the 4E cognition group (webpage)
 - * Watch the introduction to 4E concepts by Shaun Gallagher (12 minutes)

• **Week 3: Sept 25th**

Language and languaging, 1/2

- Video 1: Early days: philology and structuralism
- Video 2: Generative linguistics
- Video 3: Pragmatics, semantics
- Video 4: Syntax, morphology
- Additional material:
 - * Read the article by Theodore Dalrymple on The Gift of Language (5 pages)

• **Week 4: Oct 2nd**

Language and languaging, 2/2

- Video 5: Phonology and phonetics
- Video 6: The language of thought hypothesis
- Video 7: Evolution/emergence of language
- Video 8: Animal communication
- Additional material:
 - * Watch the video of a talk on language and languaging (49 minutes)
- Video 9: Joint speech and chant
- Additional material:
 - * Read the article by me on Joint Speech: The missing link between speech and music? (12 pages)

● **Week 5: Oct 9th**

Development and learning

- Video 1: The fallacy of nature vs. nurture
- Additional material:
 - * Read the blog posts on “Developmental Plasticity and the “Hard-Wired” Problem” (web page)
- Video 2: The altricial/precocial distinction
- Additional material:
 - * Read the Scientific American article on the advantages of being helpless (3 pages)
- Video 3: Jean Piaget
- Video 4: Lev Vygotsky
- Video 5: Studying sociality in the young infant
- Additional material:
 - * Read the article by Reddy and Trevarthen on “What We Learn about Babies from Engaging with their Emotions” (12 pages)
- Video 6: The human speechome project
- Additional material:
 - * Read the article about the birth of a word (Human Speechome Project) (6 pages)

● **Week 6: Oct 16th**

Perception, 1/2

- Video 1: The five(?) senses, and the box jellyfish larva
- Video 2: The retina and the visual cortex
- Video 3: The basilar membrane and the auditory cortex
- Video 4: The skin and the somatosensory cortex
- Video 5: The notion of “representation”

- Additional material:
 - * Read a representational approach to vision: Cavanagh, P. (2011). Visual cognition. *Vision research*, 51(13), 1538-1551. (13 pages)

Week 7: Oct 23rd

Perception, 2/2

- Video 6: Hubel and Wiesel, Milner and Goodale
- Video 7: Computational vision
- Video 8: Relational approaches to perception
- Video 9: Change and vision; Eye movements
- Video 10: Ecological approaches to vision
- Video 11: Fun with illusions
- Video 12: Static monocular viewing and photography
- Additional material:
 - * Read a non-representational approach to vision: Goldstein, E. B. (1981). The Ecology of JJ Gibson's Perception. *Leonardo*, 191-195. (5 pages)

• **Week 8: Oct 30th: Bank Holiday, no class**

• **Week 9: Nov 6th**

Social cognition

- Video 1: The psychological/social divide
- Video 2: Intersubjectivity
- Additional material:
 - * Read Cummins, F. (2014). Voice,(Inter-) Subjectivity, and Real Time Recurrent Interaction. *Frontiers in Psychology*, 5(760). (10 pages)
- Video 3: Theory theory and simulation theory
- Video 4: Participatory sense-making
- Additional material:
 - * Read Schilbach, L., Timmermans, B., Reddy, V., Costall, A., Bente, G., Schlicht, T., & Vogeley, K. (2013). Toward a second-person neuroscience. *Behavioral and Brain Sciences*, 36(04), 393-414. (57 pages! Don't feel you have to ingest everything. Get the main argument.)
- Video 5: Harry Harlow
- Video 6: Stanley Milgram
- Additional material:
 - * Read about the famous Milgram Obedience experiment in the blog post: "Milgram's Experiments and the Perils of Obedience"

- * Read either the Scientific American article (How Nazi's Defense of "Just Following Orders" Plays Out in the Mind) or the Nature article (Modern Milgram experiment sheds light on power of authority). Keep your critical thinking cap on!
- Video 7: The Stanford Prison Experiment (not an experiment)
- Video 8 (optional): Dunbar's number
- Video 9: Collective dynamics

- **Week 10, Nov 13th**

Cognitive neuroscience, 1/2

- Video 1: The puzzle of the brain
- Video 2: What does the word "function" mean?
- Video 3: The neuron doctrine
- Additional material:
 - * The argument about the neuron doctrine seemed to be settled 100 years ago. Now we are not so sure. Fields, R. D. (2006). Beyond the neuron doctrine. Scientific American Mind, 17(3), 20-27. (7 pages)
- Video 4: McCulloch and Pitts
- Video 5: Phrenology and the localisation of function
- Additional material:
 - * Read the blog post by Neurocritic on "A comparison of modern and older phrenology" (short webpage)

- **Week 11, Nov 20th**

Cognitive neuroscience, 2/2

- Video 6: Pathology and animal studies
- Video 7: Anatomical imaging
- Video 8: EEG and NIRS
- Video 9: functional Magnetic Resonance Imaging (fMRI)
- Video 10: Mirror neurons
- Additional material:
 - * Read the blogpost by John Mark Taylor: "Mirror Neurons After a Quarter Century: New light, new cracks"
- Video 11: Von Economo or Spindle Cell neurons
- Additional material:
 - * Read Chen, Ingfei (2009): Brain Cells for Socializing: Does an obscure nerve cell help explain what gorillas, elephants, whales—and people—have in common? Smithsonian Magazine

- **Week 12, Nov 27th**

Movement science

- Video 1: Movement and behaviour
- Video 2: What do brains do?
- Additional material:
 - * Watch the Ted talk by Rolf Pfeiffer (19 minutes)
 - * In the spirit of the pioneering work of Eadward Muybridge, please enjoy the short video of the movement of a vampire bat. (7 seconds!)
- Video 3: The role of goals
- Video 4: Movement and the brain

4 Assessment

Students in this course are required to write two essays, each limited to 3,000 words. You should trawl the primary literature (Google Scholar is your friend) and expose yourself to novel work. The essays carry equal weight. Suggested essay topics can be found from the course webpage.

The first essay is to be submitted by 5 pm on Friday Nov 17th. The second essay is to be submitted by 5 pm on Friday December 8th. Please submit each essay through Brightspace.