Weekly schedule (Jan 2018)

Week 1 JAN 8-10 Introduction to the course

Lesson 1. Introduction to the course I
We don't see film cuts For millennia, we'd never seen anything like film cuts. How do we process them so easily? | Aeon Videos
Optical illusions show how we see a TED talk by Beau Lotto
https://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see
Seminar 1.

Lesson 2 Introduction to the course II From genes to neurons and circuits. What is inside the brain.
Seminar 2. Discussion

Reading assignments:
What is Neuroscience? BrainFacts.org
http://www.brainfacts.org/about-neuroscience/what-is-neuroscience/
Do we see reality as it is? a TED talk by Donald Hoffman:
https://www.ted.com/talks/donald_hoffman_do_we_see_reality_as_it_is

Week 2 JAN 15-17 What is perception? The representation of the world

Lesson 3. The representation of the world: the sensory systems. The organization of sensory systems: parallel processing sensory receptors, brain localization, distortion, top-down and bottom–up processing.
Seminar 3. The Sensory Systems

Lesson 4. The visual world: from the retina to the brain. Why we like line drawings?. Rods and cones. Retinal processing and contrast. The smile of Mona Lisa.
Seminar 4. What happens in the retina

Reading assignments:
Vilis, T. (2014) L1The eye http://www.tutis.ca/Senses/L1Eye/L1eye.swf
BrainFacts.org A primer on the brain and Nervous System.
Chapter 3, 18-24 http://www.brainfacts.org/~/media/Brainfacts/Article Multimedia/About Neuroscience/Brain Facts book.ashx

Week 3 JAN 22-24 The visual brain: shapes and space in art

Lesson 5. The visual areas in the brain. How do we identify objects? Feature extraction. The brain is kantian: brain categorisation, shape and objects. The conceptual neurons "face cells", the "object cells". Bosch and "the garden of earthly delights"
Seminar 5. The visual cortex

Lesson 6. The construction of space. Binocular cues and monocular spatial reconstruction. From Fra Angelico to Sorolla: looking at the history of painting. Why they were so great. Magritte and Picasso: how to subvert the law.
Seminar 6. Space in painting

Reading assignments:
Vilis, T L2 The visual cortex http://www.tutis.ca/Senses/L2VisualCortex/l2v1.swf
ZEKI, S. (1997) The Wodhull Lecture: visual art and the visual brain. Proc. Royal Institution of Great Britain, pp29-63 http://www.vislab.ucl.ac.uk/pdf/Woodhull.pdf

Week 4 JAN 29-31 The visual brain: colours, art and brain.

Lesson 7. Is colour in our brain? What is colour and the construction of colour and light. The colour opponent theory. From medieval miniatures to Mondrian
Seminar 7. Colours, demos and questions.

Reading assignments:
Vilis, T. (2014) L1The eye http://www.tutis.ca/Senses/L1Eye/L1eye.swf
Vilis, T L2 The visual cortex http://www.tutis.ca/Senses/L2VisualCortex/l2v1.swf

Lesson 8. Neuroscience and art. Beauty and meaning. The evolutionary history of the beauty and history of art. Aesthetic universals?. Artists as intuitive neurologists. Is cubism a *neurological fiasco*?
Seminar 8 Neuroscience and art and general MT *pre-exam* review.

Reading assignments:
Livingstone, M. (2014) Vision and Art: The Biology of Seeing, Harry N. Abrams Pub. See also: (2009) What art can tell us about the brain. Lecture at the University of Michigan http://www.youtube.com/watch?v=338GgSbZUYU

Week 5 FEB 5-7 Art and Brain

Visit to the National Art Museum of Catalonia (MNAC)

Mid-term exam

Week 6 FEB 12-14 Brain and Music.

Lesson 9 Hearing. The inner ear. The auditory brain. Auditory objects. Sound localisation: what we learn from owls and bats
Seminar 9. Audition demos and questions. MT exam review.

Reading assignments:
Vilis (2014) L9 Hearing http://www.tutis.ca/Senses/L9Auditory/L9Auditory.swf

Lesson 10. Music, hearing and brain: from hair cells of ecstasy. Pitch, tones and octaves. The constancy of musical scales.
Seminar 10: The musicians as magicians: music tells a lot about the brain.

Reading assignments:
Zatorre & Salimpoor (2013) From perception to pleasure: music and its neural substrates. Proc Natl Acad Sci U S A. 110 Suppl 2 :10430-7
http://www.pnas.org/content/110/Supplement_2/10430.long

Week 7 FEB 19-21 Neurosciences and Philosophy

Lesson 11 Perception and knowledge: the myth of the cave and the neurosciences. The question of how we know the world.
Seminar 11 Reading on knowledge.
Reading assignments: Plato, The Republic, book VII:
http://www.gutenberg.org/files/1497/1497-h/1497-h.htm
Noam Chomsky (2011) The machine, the ghost and the limits of understanding https://www.youtube.com/watch?v=D5in5EdjhD0

Lesson 12 Genes and culture I: Early experience and perception. The "critical periods" of post-natal development. Brain plasticity: interactions between the brain and the environment.
Seminar 12 Genes and culture

Reading assignments: Kandel, E (2013) The new science of mind and the future of knowledge. Neuron, 80: 546-560

Week 8 FEB 26-28 Neurosciences and Philosophy

Lesson 13 Genes and culture II The question of "nature and nurture". Correlation and causation. Genes, environment and chance. Chance and necessity.
Seminar 13 Discussion seminar

Reading assignments:
Moore, D.S. and Shenk, D. (2017) The heritability fallacy WIREs Cogn Sci 2017, 8:e1400. doi: 10.1002/wcs.1400
Critical periods. Society for Neurosciences http://www.brainfacts.org/Brain-Basics/Brain-Development/Articles/2012/Critical-Periods

ST1 Student term paper presentations

Week 9 MAR 5-7 Student's "chalk-talks"

ST2 Student term paper presentations

ST3 Student term paper presentations

Week 10 MAR 12-14 Student's "chalk-talks"

ST4 Student term paper presentations

General discussion and *pre-exam* review seminar.

Week 11 MAR 19 Final exam

Final exam MARCH 19th

Readings:

Textbooks on Neuroscience

KANDEL, E.R., SCHWARTZ, J.H., JESSEL, T.M., SIEGELBAUM, S.A. and HUNDSPETH, A.J. (2013) ch. 16, 21, 25-31, 61 Principles of Neural Science. Fifth Edition. McGraw-Hill, New York, USA

WOLFE ET AL. (2015) ch. 1-11. Sensation and Perception. 5thed, Sinauer Ass., Inc. Publishers, USA

Online books on Neuroscience and Philosophy

VILIS, T. (2014) The Physiology of the Senses Transformations for Perception and Action http://www.tutis.ca/Senses/index.htm

UTHealth (2014) Neuroscience Online. An electronic textbook for the Neurosciences, University of Texas, Dept. Neurobiology and Anatomy
http://nba.uth.tmc.edu/neuroscience/

PURVES, D. et al Neuroscience, 2nd ed.
http://www.ncbi.nlm.nih.gov/books/NBK10799/?term=neuroscience

STANFORD Encyclopedia of Philosophy http://plato.stanford.edu/

Assessment criteria:

Midterm exam: 30%
Final exam: 30%
Class participation: 20%
Term paper and class presentation: 20%

Midterm and final exams are of assay-type with short questions and problems.

Term paper and class presentation. For the **Student Talks (STs)**, students will make an oral presentation to their classmates and teachers. Students will select a topic from a list of offered articles (see Aula Global), or they may propose their own before week 5. They have to deliver an abstract by week 8, when presentations begin.

The activity includes: 1) One page abstract of no more than 550 words (Arial 10) containing the relevant information and three references. A figure may be included if appropriate. 2) A talk of 10 minutes + 10 minutes discussion. 3) A presentation on the blackboard, a so-called "*chalk talk*", Power-Point not allowed.

MORE INFO:

Course title: Neuroscience for Humanities and Social Sciences
Language of instruction: English
Professor: Fernando Giraldez
Professor's contact and office hours:
CEXS-UPF, at PRBB c/Dr. Aiguader 88, 08003, Barcelona
Office: 328.06. Office hours: 9am-5pm
Phone: 933160838
fernando.giraldez@upf.edu
Course contact hours: 45
Recommended credit: 3 US credits-5 ECTS credits
Course prerequisites: There are no prerequisites for this course.
Language requirements: None
Number of students (max.): 20

Course focus and approach:

Neurosciences study the brain, from genes and cells to behavior and it has provided radical new clues about how the brain works. This knowledge has strong implications for many areas of human activity outside the conventional environment of medicine or psychology, and expands to economics, laws, philosophy or art. On the other hand, Neuroscience has attracted the attention of society, sometimes beyond evidence. The course focuses on a solid dialogue between neurosciences and humanities.

Course description:
This is an accessible account of selected areas of Neurosciences of particular interest for Humanities and Social Sciences. The course starts with a general overview of the brain to then review how the sensory systems build up a representation of the world, with particular reference to the visual and auditory systems. Then we analyze examples of the constructive character of perception, brain categorization, and the construction of sensory images, space and movement. Finally, we address the question of consciousness and perception of self, to discuss the implications of Neurosciences in the foundations of knowledge, Law and Arts.

Learning objectives:
Major goals are:
1) To understand the basic principles of brain function.
2) To understand the neural basis of perception.
3) To be able to apply knowledge in Neurosciences to central problems of Philosophy, Law, Communication and Arts.

Course workload: The course is based on discussion sessions and lectures. Students will read 4 short papers (two-three pages), 5 fragments or book chapters and write 2-4 short papers/reports (one page) along the course. Students will do a 10 minute oral presentation to the class. There will be a mid-term and a final exam.

Teaching methodology: The course will be developed inspired in the flipper classroom, combined with a set of lectures and seminars. Lectures are intercalated with discussion sessions. Materials, power point PDFs, handouts and readings will be available in advance. There will be some selected lectures given by guest speakers. Seminars consist of problem solving, paper discussions and general discussions with invited speakers. Demonstrations include animations and interactive materials.

Activities will be developed in English.

It is expected that students contribute with their own background to discussions and works.