

Cognitive Neurosciences

Master in Cognitive Science

PSL & Université Paris Descartes

Coordinator: Laura Dugué (laura.dugue@parisdescartes.fr)

Level: 2

Major(s): Neuroscience

Semestre: S2, **ECTS:** 6,

Number of hours: 27h CM, 9h TD, 3h Final evaluation

Course taught in: English

Schoology access code: 8JZ5H-ZRV5D

Code: NEURO 201

Prerequisites: All students will need basic brain physiology knowledge (ideally Introduction to Cognitive Neuroscience), as well as basic neuroimaging methodological knowledge (ideally Methods in Neurosciences).

1a. Course description (English)

The course will be divided in 3 sections. First, we will present how sensory systems such as vision and audition can be used as models to investigate higher cognitive functions. Second, we will present and discuss methodological considerations to the study of cognition in humans and animals. Third, we will concentrate on four case studies (predictive brain, attention/perception, consciousness and language). We will present how one can study these cognitive functions using a multimodal approach including various models (vision/audition, animals/humans), and approaches (neuroimaging, psychophysics, modelling).

1b. Description du cours (Français)

Le cours sera divisé en 3 sections. Premièrement, nous verrons comment les systèmes sensoriels tels que la vision et l'audition peuvent être utilisés comme modèles pour étudier les fonctions cognitives supérieures. Ensuite, nous discuterons de considérations méthodologiques à l'étude de la cognition chez l'Homme et l'Animal. Enfin, nous nous concentrerons sur quatre cas d'étude (le cerveau prédictif, attention/perception, conscience et langage).

2. Learning outcomes

On successful completion of this course, students should be able to: understand how to appropriately go about investigating given cognitive function with neuroscience approaches; critically analyse scientific research articles.

3a. Pedagogy, class organization and homework

Each section will be complemented by three 2h-TD sessions performed by Laura Dugué to work on exercises based on the classes. These TD sessions will not only help develop students' ability to critically analyse scientific articles, but will also prepare them to the final exam. Laura Dugué will also ensure continuity along the semester.

3b. Assessment

Three midterm written exams (40%): The corrected exams will be uploaded to schoology after the exam. Laura Dugué will provide additional feedback to the students that require it.

Final written exam (60%): This exam will not contain knowledge questions but will consist in figure analysis. The 3 TD classes will prepare for this final exam. The journal article from which the figures were extracted will be uploaded to schoology after the exam. Laura Dugué will provide additional feedback to the students that require it. The introduction class will allow ensuring the evaluation process is clear for all students.

3c. Textbook and readings

This course does not have a textbook since we will cover a large ground. Occasionally, the teacher will assign papers, which students should read in preparation for a class, and sometime they will provide them after, in complement of the lecture. These will be made available for download on schoology. The slides will be provided on schoology by each teacher after completion of their class.

4. Course content

Introduction – Laura Dugué

Models to study cognition: the vision model – Laura Dugué

Models to study cognition: the auditory model – Sophie Herbst

Exam I (1h) + TD (2h) – Laura Dugué

Methods: animal vs. human model – Pierre Pouget

Methods: frequent methodological problems in cognitive neuroscience –
Florent Meyniel

Exam II (1h) + TD (2h) – Laura Dugué

Multimodal approach to study cognition: Predictive brain case study –
Florent Meyniel

Multimodal approach to study cognition: Attention/perception case study –
Laura Dugué

Multimodal approach to study cognition: Consciousness case study –
Claire Sergent

Multimodal approach to study cognition: Language case study – Ramon
Guevara Mariano

Exam III (1h) + TD (2h) – Laura Dugué

Final exam (3h) – Laura Dugué

5. Course policies

Attendance. Regular attendance of, and punctual arrival at, both lectures and TD are crucial to succeed in this course, and they are mandatory for all students registered for

credit. This is important both for your individual success in this course, and for every other students' success. Keep in mind in particular that, by arriving late, you are jeopardizing your own but also your classmates' education by disrupting the flow of lectures. Practically speaking, if you are registered for credit then your grade will suffer from poor attendance or recurrent late arrivals. If you are not registered for credit, the same policy applies, though with different consequences: poor attendance or recurrent late arrivals may force us to ask you to stop auditing the course.