## **Neuropsycho. Anatomofunctional Base Cognitive Processes**

## Prof. Maria Caterina Silveri; Prof. Sonia Di Tella; Prof. Camillo Marra; Prof. Davide Quaranta

Module 1:

Unit 1: Prof. Maria Caterina Silveri

Unit 2: Prof. Davide Quaranta

Module 2:

Unit 1: Prof. Sonia Di Tella

Unit 2: Prof. Prof. Camillo Marra

The programmes of Module 1 and Module 2 overlap. The lectures of Professors Davide Quaranta and Camillo Marra will mainly focus on the functional anatomy of cognitive processes.

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

Knowledge of the neural bases (structural and functional) that support the cognitive systems (elements of neuroanatomy and neurophysiology).

Knowledge of the main cognitive models.

Identification of cognitive/behavioural syndromes related to brain damage. Acquisition of investigation methods and tools (tests and neuropsychological batteries; behavioural scales; neuroimaging and electrophysiological techniques applied to clinical neuropsychology).

At the end of the course, students will be able to recognise the general characteristics of the main cognitive disorders arising from brain lesions, and frame the pathologies that underlie these lesions. Students will also be able to interpret disorders of the various cognitive functions on the basis of the relative models that describe their functional organisation, including from the perspective of rehabilitative interventions.

***COURSE CONTENT***

Introduction to Neuropsychology and Cognitive Neuroscience: definitions, historical outline, methods.

*Functional neuroanatomy:*

- General principles: macroscopic anatomy; organisation of afferent and efferent pathways.

- Functional anatomy of episodic memory: anatomo-functional subdivisions of the medial temporal structures, the thalamus and the basal forebrain.

- Functional anatomy of attention and executive functions: anatomo-functional subdivisions of the frontal lobe and basal nuclei; cortico-subcortical connections.

- Functional anatomy of visual-spatial skills: anatomo-functional subdivisions of the parietal lobe; neuroanatomical and neurophysiological substrates of visual processing: optic pathways, occipital lobe.

- Functional anatomy of language: neuroanatomy of the perisylvian regions, the temporal lobe and the related cortico-cortical connection bundles.

- Functional anatomy of the cerebellum: organisation of the cerebellar cortex and of the afferent and efferent pathways; functional subdivisions.

- Functional anatomy of emotions: organisation of the limbic system.

*Neuropsychological and behavioural syndromes:*

- Functional organisation of memory systems.

- Episodic, semantic, "working" memory disorders.

- Functional organisation of language: neuro-anatomical and psychological bases.

- Speech disorders (aphasia, dysgraphia, dyslexia).

- Praxis disorders.

- Disturbances in spatial attention (hemi-attention).

- Attention, executive function, “default mode network” and “salience”.

- Perception and agnosia.

- Calculation disorders.

- Dementia.

- Cognitive-affective syndrome in cerebellar damage.

- Cognitive-behavioural syndrome in damage of the basal ganglia.

- Neuropsychology of emotions.

- Behaviour and social cognition.

- Neuropsychology in childhood.

– Neurological disorders related to cognitive damage.

- Rehabilitation of cognitive functions.

***READING LIST***

 *Suggested texts*

1) Quaranta D, Silveri MC, Marra C., *Introduzione alla neuroanatomia funzionale dei processsi cognitivi*- Vita e Pensiero, Milano 2022, ISBN 9788834351147.

2) Vallar G. Papagno C. (a cura di), *Manuale di neuropsicologia*, 2018 Il Mulino ISBN, 9788815278708

*For further information:*

3) *Manuale di neuropsicologia - Normalità e patologia dei processi cognitivi*, a cura di Denes - Pizzamiglio - Guariglia - Cappa - Grossi - Luzzatti, Zanichelli 2019, ISBN:9788808220967

***TEACHING METHOD***

Lectures.

Practical demonstrations via video presentation.

Supplementary Teaching: Each module will include 30 hours of supplementary teaching for exercises and further study of topics covered during frontal lectures.

***ASSESSMENT METHOD AND CRITERIA***

A written exam.

The exam will focus on the texts and topics indicated in the Faculty Guide, to be found in the appropriate section on the website www.unicatt.it. The final written exam consists of open-ended questions on the topics covered in the “Neuropsychology with anatomical and functional elements of cognitive processes” course and in the supplementary teaching.

In particular, four open-ended questions on different topics will be proposed to the student. Consistency of the answers will be assessed in terms of: knowledge of the topic; ability to summarise; command of terminology; and syntactic and conceptual organisation of the paper. Each answer will be given a mark from 17 (insufficient) to 30 with distinction; the average of the four marks will constitute the exam mark. The exam will be considered passed if an average of 18 is achieved and if a sufficient mark has been achieved in at least three of the four questions.

***NOTES AND PREREQUISITES***

A basic knowledge of the functional organisation of the brain is considered a prerequisite to the course topics.

*Should the current Covid-19 health emergency not allow face-to-face teaching, remote teaching in synchronous or asynchronous mode will be guaranteed; this will be communicated in good time to students.*

Further information can be found on the lecturer’s webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.