UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Neuro-Functional Basis of Cognitive and Affective Processes

2526-2-F5105P012-F5105P014M

Learning area

Affective Neuroscience, Social Neuroscience, Cognitive neuroscience, Cognitive Electrophysiology

Learning objectives

Knowledge and understanding
Students will acquire a comprehensive understanding of the neural mechanisms underlying social and affective cognition, including emotion recognition, empathy, facial processing, and social interaction. Emphasis is placed on experimental evidence from neuroimaging techniques such as EEG, ERP, MEG and fMRI.

Applying knowledge and understanding
Learners will be able to apply neuroscientific knowledge to analyze affective and social processes in both typical and clinical populations. They will learn to interpret empirical data and critically asses research studies in the domains of social neuroscience and affective processing.

Making judgements
Students will develop the ability to critically evaluate scientific literature and experimental methodologies in social and affective neuroscience, with attention to ethical issues, methodological rigor, and the interpretation of neural data related to human behavior and emotion.

Communication skills
Participants will improve their academic communication skills through the presentation and discussion of scientific findings in both written and oral forms, using appropriate technical terminology in English. They will also be encouraged to communicate complex neuroscientific concepts to non-specialist audiences.

Learning skills
The course will enhance students' ability to engage in autonomous learning through the critical reading of scientific

articles, the use of online databases, and active participation in class discussions. These skills will prepare them for further study or research in cognitive, affective, or clinical neuroscience.

Contents

This course provides essential knowledge concerning the main cognitive models and the neurophysiological bases of social and emotional-motivational processes in humans, in order to promote the understanding of socio-emotional and behavioral functions, both in healthy people and patients with specific social or affective disorders.

Detailed program

1. The Mirror Neuron System: action coding, affordance, rolandic mu rhythm, embodied simulation, McGurk effect
2. Audio/visuomotor neural representation of musical gestures
3. Social brain: face, gaze and gesture processing, biological motion
4. Sex difference in the social brain: face processing, negative affect, pareidolia, empathy for pain, parental behavior
5. Moral deficits in neurological and psychiatric patients
6. Antisocial personality disorders: sociopathy
7. Orbitofrontal cortex and the moral brain (altruism, cooperation, equity, justice, guilt, shame)
8. The development of morality in humans and primates
9. Theory of Mind, mentalization, false beliefs, TOM humor
10. The neural representation of Self, Close and Other
11. FMRI, connectivity and eye-tracking evidences of functional abnormalities in ASD individuals
12. The default-mode network
13. Other-race effect, social prejudices and stereotypes

Prerequisites

This course requires a basic knowledge of anatomy and physiology of the nervous system and its cognitive functions.

The understanding of textbook, chapters and scientific articles in English.

Teaching methods

Frontal lessons with slides and audio/video presentations. Presentation and discussion of ongoing data and research articles.
(a) nature of teaching: dispensing and interactive
(b) type of teaching activity: lecture
(c) hours possibly delivered remotely = none (except for emergency)

Assessment methods

The exam is only written.
The written exam consists in short essays (exposition of topics covered in class and described in study material/book chapters)

Textbooks and Reading Materials

From the handbook, which is online and with open access: “Social and Affective Neuroscience of Everyday Human Interaction - From Theory to Methodology”, Springer Nature, Boggio et al. (2022).
Part 2. Social Neuroscience and Moral Emotions
Chapter 5. AM Proverbio, A Zani Mirror neurons in actions…ERP and neuroimaging evidences
Chapter 6: AM Proverbio Sex differences in social cognition
Part 4. Methods used in Social and Affective Neuroscience
Chapter 12: AM Proverbio EEG and ERPs in the study of Language and Social Knowledge

2. Gazzaniga M.S., Ivry R.B., & Mangun G.R. (2019). Cognitive Neuroscience. New York: Norton (ONLY **Chapters 13 & 14)**.

Lesson slides will be provided during the course and uploaded on the appropriate E-learning web page.

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | GENDER EQUALITY