COURSE SYLLABUS

Cognitive Neuroscience

2122-1-F5105P002

Learning area

Applied Experimental Psychological Sciences

Learning objectives

Knowledge and understanding

This course provides a strong background in systems-level neuroscience and allows students to develop integrative research interests that cross domains. The laboratory will allow students to learn how to program basic experiments in cognitive neuroscience.

Applying knowledge and understanding

Students in the program gain a thorough understanding of the intellectual issues that drive this rapidly growing field, as well as expertise in the major methods for research on higher brain function. Students will also learn to apply the acquired knowledge to design and carry out empirical studies in the field of cognitive neuroscience. In particular, they will learn how to design experiments in *E-Prime*, a program designed to facilitate the conception of any experiment that uses a computer as an interface between the subject and the experimenter.

Contents

The course provides a thorough update and review of fundamental issues in cognitive neuroscience, also considering most recent methodological approaches within the field. It will cover recent developments in research on the neural bases of perception, memory, imagery, conceptual representation, executive functions

Detailed program

Recent developments in the study of the

- neurofunctional mechanisms involved in perception of different stimuli categories;

- neural underpinning of mental imagery ;

- sensory deprivation and brain plasticity;

- cognitive neuroscience of memory;

- organization of conceptual knowledge of objects in the human brain;

- conflict monitoring and cognitive control;

- reward system and neuroaesthetics

Prerequisites

This course requires a basic knowledge of anatomy and physiology of the nervous system and its cognitive functions. Students lacking such basic knowledge are encouraged to ask for a list of basic references.

Teaching methods

The course will consist of frontal lessons, classwork, discussion on scientific papers, and assignments. All course material (e.g., slides, readings) are made available on the e-learning website of the course, so that also non-attending students can use it.

Lessons will be held in presence, unless further COVID-19 related restrictions are imposed.

Assessment methods

The exam will verify the level of mastery of the course contents with special attention to:

- Methods and research designs in cognitive neuroscience;

- Ability to elaborate course contents;

- Ability to analyze scientific papers in the field of cognitive neuroscience.

The exam will consist of several true-false questions and a number of open questions covering all the topics of the course. For those students who request it, an oral interview is also provided, on all the topics of the course: the mark obtained in the oral test will be averaged with that obtained in the written test. The evaluation criteria are: the correctness of the answers, the ability to argue, synthesize, create links, and critically discuss the course topics.

Textbooks and Reading Materials

The course material will be indicated during the course and will be uploaded on the course web-site.