Table 1: objectives of educational activities

Master's programme in Cognitive Science: planned educational objectives subsequent to 2019/2020

Curriculum CN - Cognitive Neuroscience

Nome insegnamento Course name	Obiettivi formativi Educational objectives
Clinical Neuropsychology	The aim of this course is to provide an introduction to clinical neuropsychology. The student will be introduced to methods of clinical neuropsychological assessment and rehabilitation. A range of neuropsychological test procedures will be introduced. The student will also be introduced to the neuropsychological profile of a range of neurological disorders assessment and rehabilitation of neuropsychological disorders. At the end of the course, students should be able to describe the main neuropsychological disorders and to know the main assessment and rehabilitation procedure.
Current Issues in Neuroscience: Animal Models	The course would provide the theoretical and empirical foundations of comparative research on animal cognition. It will cover all the traditional topics in animal cognition - perception, learning and memory, categorization, thinking and reasoning, and communication/language. Practical in the animal cognition lab will be part of the course.
Current Topics in Brain Connectivity	In this seminar course, we will read and discuss up-to-date scientific contributions in the field of general brain connectivity, focusing on both functional and anatomical connectivity measures. The goal of this introductory course is to provide a basic knowledge of the state-of-the-art methods and concepts of accessing brain connectivity measures. The course is based on active learning and participation. At the end of the course, students will acquire a good overview of the current debates on brain connectivity and they will learn the appropriate terminology and computational concepts. They will familiarize with the concepts of experimental connectivity measures and they will be able to critically access new publications on the topic.
Developmental Neuroscience	This course will address molecular, cellular, anatomical and functional aspects of central nervous system development. Specific topics will include embryonic development, postnatal critical periods of visual, auditory and language areas, neurodevelopmental disorders and neural basis of adolescent behavior. At the end of the course, the students should be able to acquire an updated view of our understanding of human brain development and its impact on brain pathologies.
Foundations of Brain Imaging	This course will cover the foundations of neuroimaging techniques commonly used in cognitive neuroscience. Students will obtain a basic understanding (i.e., methodological foundation) of non-invasive brain imaging and neurostimulation techniques used in cognitive neuroscience research. The programme contains specialized modules on the theory and methods of functional and structural magnetic resonance imaging; electro- and magneto-encephalography; transcranial electric and magnetic stimulation, as well as multimodal approaches. At the end of the course, students should be able to describe the basic principles, advantages, limitations and cognitive neuroscience application examples of the neuroimaging methods discussed.
Foundations of Cognitive Psychology and Neuroscience I	This course will examine to perceive, pay attention, remember, plan and represent ours and others' actions. It will explore the neuroanatomical and neurophysiological basis of cognitive functions, considering evidence form functional neuroimaging and clinical studies. The teaching methods will include lectures, demonstrations, patient videos, class discussion. By the end of this course, students will have gained a much better understanding of the basic topics in cognitive psychology and neuroscience and will be able to describe the appropriate methods.
Foundations of Cognitive Psychology and Neuroscience II	This course will examine the mental processes underlying "higher level" cognitive functions. Specifically, it will explore our ability to perform culturally mediated functions (such as reading, writing, and mathematics), as well as our capacity to reason, make decisions, and solve problems. It will also examine issues related to neurocognitive development. The course will explore the behavioral, neuroanatomical, and neurophysiological basis of aforementioned cognitive functions, considering evidence from cognitive psychology, functional neuroimaging and clinical studies. The teaching methods will include lectures, videos, and class discussions. By the end of this course, students will have gained a much better understanding of the basic topics in cognitive psychology and neuroscience and will be able to describe the appropriate methods.

Hands on Methods Course	The first part of the class focuses on fMRI data analysis, i.e. the statistics of fMRI data analysis and how that should influence your design decisions and conclusions. By understanding the statistical concepts of fMRI data analysis, students will understand the rationale of the preprocessing pipeline in fMRI and the types of choices fMRI researchers have to make when designing their experiments. By actually modeling and analyzing fMRI data students will get a deeper understanding of fMRI data analysis and at the same time gain experience that will make it easier for them to read fMRI papers and to perform their own imaging studies in the future. The second part of the course involves the hand on analysis of MEG data.
Internship	The internship is a period of training done by the student within the degree program, in order to achieve moments of alternation between study and work and to facilitate future career developments.
Introduction to Computer Programming	The course introduces computer programming, focusing on those aspects that are most relevant to behavioral and neuroimaging studies in cognitive neuroscience. At the end of the course, the students should be able to master the computer language proposed.
Master Thesis	The final examination is an important moment in the pathway of study for two primary reasons. First, it allows for verification of the student's capacity to integrate content from the program and apply this knowledge to his/her own empirical research. Second, it allows for assessment of the student's skills in formulating, writing and discussing a scientific argument.
Neural Foundations of Human Behavior	This course has been designed to cover basic anatomical and functional aspects of the central nervous system. Specific topics covered include neuronal function, synaptic transmission, sensory processing, movement, sleep and neural plasticity. At the end of the course, the students should be able to summarize our understanding of the functional organization of the human brain.
Neuroscience	This course will look at a number of the major neural systems in detail, examining their structure and function. Contemporary studies will provide much of the teaching material and a strong emphasis will be placed on the latest developments in each field. Subjects to be covered will include the visual system, the auditory system, motor pathways, attention mechanisms, eye movements and memory.
Research Design	This course will cover some fundamentals of algebra, probability theory, and statistics. Furthermore, the course will cover all aspects of a research project, such as, sample sizes, measures, and type of experimental designs. Students will present and comment research on cognitive science topics. Discussions also include presentations of research to various audiences, abstracts, reviews, grant process, and scientific ethics.
Advanced Cognitive Psychology and Neuroscience	This course will sample from across the cognitive psychology and neuroscience, offering an in-depth look into a selection of contemporary and influential topics. This course will involve the reading, active discussion and presentation of original research papers and review articles. At the end of the course the students will be able to: understand the main notions and the key problems related to the specific topic addressed in the module and to analyse critically the scientific literature.
Psycholinguistics	This course will promote an in-depth understanding of the cognitive and neurobiological bases of human language, as informed by interdisciplinary research in psycholinguistics that combines behavioral, psychophysiological, and neuroimaging approaches. Particular emphasis will be given to experimental evidence and derived psycholinguistic models on language comprehension and production, reading, language development, language acquisition, and multilingualism, both in normal and in pathological conditions. Teaching methods will include lectures, class presentations and discussions, and experimental simulations.

Curriculum LMI - Language and Multimodal Interaction

Nome insegnamento Course name	Obiettivi formativi Educational objectives
Understanding Cognitive Psychology and Neuroscience	The aims of the course are to provide students with a broad understanding of the mental processes underlying cognitive functions. It will explore the neuroanatomical and neurophysiological basis of cognitive functions, considering evidence form functional neuroimaging and clinical studies. In doing so, students will also learn about the goals of cognitive psychology and cognitive neuroscience research and the methods that are being employed to reach these goals.
Computational Linguistics	The course introduces the basics of computational linguistics by giving an overview of the field. It then focuses on the syntax and semantics of natural language familiarizing students with lexicalized formal grammars and computational semantics models. The second part of the course introduces students to multimodal models by considering in particular language and vision modalities. Students will hence gain a good overview of the field, its methods and main long-term goals.
Computational Skills for Text Analysis	The course introduces computer programming, focusing on those aspects that are most relevant to text processing: regular expressions, text segmentation, and extraction of lexical and linguistic information from text.
Current Topics in Language and Brain	In the first part of the course, we will address how different data sources have been used in the past to draw inferences on the relationships between language and the brain, and if/how the same sources can be used to complement current neuroimaging techniques. In the second part of the course, we will focus on three topics: the functional neuroanatomy of reading/writing, and how the brain adapted to the development of written language; the neural underpinnings of (morpho) syntactic skills; the neural correlates of phonological working memory.
Functional Anatomy of Language	This course provides information about the organization of the brain and its networks, focusing on the neural correlates of language and how, during the years, this knowledge has evolved. It provides also some basic information on the effects of brain lesions.
Human Language Technologies	The course introduces how to computationally approach and manage human language technologies. The topics covered are creation of annotated corpora, syntax (e.g. parsing), semantics (e.g. similarity, word sense disambiguation), until more advanced issues of pragmatics such as affective and emotion recognition, computational treatment of persuasive and creative language. Particular attention will be given to the use of out-of-the-shelf NLP tools, so that the students can gain hands on experience.
Internship	The internship is a period of training done by the student within the degree program, in order to achieve moments of alternation between study and work and to facilitate future career developments.
Intro to Human Language	This module is an introduction to language science (linguistics) covering phonetics and phonology, morphology and lexical knowledge, syntax, phrase semantics, discourse, and anaphora. No previous knowledge of linguistics is required.
Introduction to Machine Learning for Natural Language Processing	This class presents a survey of methods from the fields of statistics and machine learning aimed at extracting generalizations from example data, and use them to automatically analyze new data. The class focuses on case studies in the analysis of different components of natural language.
Logical Structures in Natural Language	A general introduction to the study of meaning in natural language using the tools of formal semantics. Topics include the relation of predicate logic with natural language operators; lexical semantics, compositional semantics, nominal and verbal quantifications; modification; event semantics; genericity, and the semantics of grammatical features.
Master Thesis	The final examination is an important moment in the pathway of study for two primary reasons. First, it allows for verification of the student's capacity to integrate content from the program and apply this knowledge to his/her own empirical research. Second, it allows for assessment of the student's skills in formulating, writing and discussing a scientific argument.
Neuroimaging for Data Science	This course will cover the foundations of neuroimaging techniques. Students will obtain a basic understanding (i.e., methodological foundation) of non-invasive brain imaging techniques. The programme contains specialised modules on the theory and methods of functional and structural magnetic resonance imaging; electro- and magneto-encephalography; as well as multimodal approaches. At the end of the course, students will be able to describe the basic principles, advantages and limitations of the neuroimaging methods discussed to an extent which permits the effective application of Data Science approaches to this medium.

Research Design	This course will cover some fundamentals of algebra, probability theory, and statistics. Furthermore, the course will cover all aspects of a research project, such as sample sizes, measures, and type of experimental designs. Students will present and comment on their own research projects in progress. At the end of the course, the students should be able to design an experiment.
Language e Social Cognition	Language comprehension necessitates construction of sentential meanings but is also linked to evaluative, inferential, and social-cognitive processes that are triggered by sentence content. The course will address these processes, and discuss issues including but not limited to: the relation between comprehension belief and verification; language and persuasion; how language promotes confirmatory or counterfactual cognitions; the impact of narrator reliability; processes specific to discourse-level processing and story-telling

Table 2: curriculum of the Cognitive Neuroscience (CN) track

Master's programme in Cognitive Science: planned educational objectives subsequent to 2019/2020

First year

Compulsory courses

Course name	CFU	SSD	Type of activity	Prerequisites
Foundations of Brain Imaging	9	M-PSI/02	caratterizzante	---
Foundations of Cognitive Psychology and Neuroscience I	6	M-PSI/01	caratterizzante	---
Foundations of Cognitive Psychology and Neuroscience II	6	M-PSI/02	caratterizzante	---
Advanced Cognitive Psychology and Neuroscience	6	M-PSI/01 M-PSI/02	caratterizzante	---
Introduction to Computer Programming	6	ING-INF/05	caratterizzante	---
Neural Foundations of Human Behaviour	6	BIO/09	caratterizzante	---
Research Design	6	M-PSI/02	caratterizzante	---
Psycholinguistics	6	L-LIN/01	caratterizzante	---

Constrained choice- 2 courses between:

Course name	CFU	SSD	Type of activity	Prerequisites
Clinical Neuropsychology	6	M-PSI/02	Affine	---
Current Issues in Neuroscience: Animal Models	6	M-PSI/02	Affine	---
Current Topics in Brain Connectivity	6	M-PSI/02	Affine	---
Developmental Neuroscience	6	M-PSI/02	Affine	---
Hands on Methods Course	6	M-PSI/08	Affine	---
Neuroscience	6	M-PSI/02	Affine	---

Second year

Compulsory courses

Course Name	CFU	SSD	Type of Activity	Prerequisites
Internship	15		other activities	Having already acquired at least 45 ECTS
Master Thesis	30		other activities	---

Free choice courses

The curriculum provides for the acquisition of 12 ECTS credits without scientific disciplinary sector constraints chosen from the teaching activities that are specifically activated by degree course and published annually in the manifesto of studies or among those activated by the University.

Educational Regulations: Master's Degree Programme in Cognitive Science

Curriculum of the Language and Multimodal Interaction (LMI) track

Master's programme in Cognitive Science: planned educational objectives subsequent to 2019/2020

First year

Compulsory courses

Course name	CFU	SSD	Type of activity	Prerequisites
Computational Linguistics	9	ING-INF/05	caratterizzante	---
Current Topics in Language and Brain	6	MPSI/02	caratterizzante	
Understanding Cognitive Psychology and Neuroscience	9	M-PSI/01	caratterizzante	---
Functional Anatomy of Language	6	M-PSI/02	caratterizzante	---
Intro to Human Language	6	L-LIN/01	caratterizzante	---
Introduction to Machine Learning for Natural Language Processing	6	ING-INF/05	caratterizzante	---
Research Design	6	M-PSI/02	caratterizzante	---

Constrained choice- 2 course between:

Course name	CFU	SSD	Type of activity	Prerequisites
Computational Skills for Text Analysis	6	ING-INF/05	Affine	---
Neuroimaging for Data Science	6	M-PSI/02	Affine	---
Human Language Technologies	6	ING-INF/05	Affine	---
Logical Structures in Natural Language	6	M-FIL/05	Affine	---
Language and Social Cognition	6	M-PSI/02	Affine	---

Second year

Compulsory courses

Course Name	CFU	SSD	Type of Activity	Prerequisites
Internship	15		other activities	Having already acquired at least 45 ECTS
Master Thesis	30		other activities	---

Free choice courses

The curriculum provides for the acquisition of 12 ECTS credits without scientific disciplinary sector constraints chosen from the teachings that are specifically activated by degree course and published annually in the manifesto of studies or among those activated by the University.