MASTER DEGREE IN COGNITIVE NEUROSCIENCE AND CLINICAL NEUROPSYCHOLOGY

Course details - Academic Year 2014/2015

MASTER DEGREE IN COGNITIVE NEUROSCIENCE AND CLINICAL NEUROPSYCHOLOGY (CN2)

From the 2012/2013 Academic Year a new Master Degree (MD) Course in *Cognitive Neuroscience and Clinical Neuropsychology* (CN2) started. The hallmark of this second-cycle MD is its international approach. It offers specialised psychology training and aims to be a recognised as a high-level qualification for academia and professional purposes at international level. All classes are conducted in English. The course programme is in line with those of the most prestigious international universities (e.g. University of Harvard, MIT) and is characterised by a broad range of units covering neuroscientific research within psychology, neurology and psychiatry. In addition to covering the latest developments in research, this MD also looks at clinical applications.

Students will acquire knowledge of the main theoretical models behind cognitive processes and their neural bases, as well as knowledge of the main cognitive disorders resulting from developmental, degenerative or acquired illnesses. Ample space is given to the application of cognitive models to psychiatric and neurological patients. Special focus is placed on research techniques into brain mechanisms and stimulation, which are covered in dedicated courses.

Consequently graduates will have basic competences in all psychology sectors and disciplines and dedicated competences in general psychology, brain anatomy and physiology, the neural processes of cognitive functions, and the neural bases of behaviour and psychophysiology.

Knowledge and training

This MD has a high number of credits (CFU) in General Psychology, Psychobiology and Physiological Psychology. Students can choose from a range of core course alternatives within the aforementioned sectors and from similar or supplementary courses, including Medicine and Biology disciplines. This course also envisages 12 CFU for an internship and 24 CFU for the final dissertation; students have 12 CFU to spend as they wish.

Course topics include the neural bases of brain functioning, the cognitive bases of mental functioning, cognitive and clinical neuropsychology, psychophysiology, clinical psychology, neuroimaging and brain stimulation techniques.

Focus is placed on studying the latest neuroimaging and brain stimulation techniques. The laboratories are equipped with sophisticated instrumentation (e.g. TMS, tDCS, LORETA software); consequently students will have the opportunity to use this technology, apply it to theory and learn practical skills.

Each course unit is structured to cover theory, method and application, both in the laboratory and in the pre-graduation internship. Many courses also combine classroom lessons with practical work and case discussions. A key feature is specific training in the analysis of images taken by functional neuroimaging. Training includes the use of software that analyses functional resonance and evoked potential, as well as the use of Near-Infrared Spectroscopy (NIRS). End-of-unit examinations and course tests assess understanding of basic knowledge, research instruments and methods, evaluation techniques and intervention.

To forge a link between study and employment, students are required to do an internship, plus laboratory and practical work, thus allowing academic staff to gauge whether they can apply what they have learned. Students must be able to demonstrate that they can reprocess theory and apply their knowledge to specific contexts. The majority of courses teach the theoretical bases and practical implication of cognitive neuroscience. Examinations are designed to test competences in both.

The final examination (24 CFU) consists in writing and discussing a dissertation. This dissertation tests whether students are able to plan, conduct and assess a project. It may be on a range of subjects, including laboratory research, applied diagnosis, rehabilitation, context analysis, attitude analysis and change, or a critique of work on a specific issue.

Admission requirements

Prospective MD students must have a first-cycle degree in psychology or a foreign qualification equivalent to the Italian degree, or considered to be suitable by a commission. The School of Psychology also requires applicants to have specific curricular requirements, e.g. curriculum studiorum and scores obtained with particular attention for exams of the field of General Psychology, Psychobiology Physiological Psychology, Psychometrics and Clinical Psychology, reference letters, motivational letter. A key requisite for prospective students is a good knowledge of written and spoken English (B2 or equivalent).

There is a limit of 30 places (22 places for EU citizens and non-EU citizens normally living in Italy; 8 places for non-resident non-EU citizens, of which 4 are reserved for Chinese students through the Marco Polo scheme) . Admission to the course (see admission notice for details) will take place on the basis of a ranking list that will be drawn up by an Examination Board after the evaluation of the requirements. Lecture and laboratory attendance is compulsory.

Professional and employment opportunities

Rapid development in the field of neuroscience has led to extensive integration between basic knowledge of the relationship between mind and brain and its practical and professional applications. The MD in CN2 offers a range of professional employment.

First, a first-cycle degree and a second-cycle degree (such as the CN2) are two of the requisites for membership of Italy's Order of Psychologists (others include a postgraduate internship and passing State examinations).

A natural follow-up to the MD in CN2 is a third-cycle Doctoral in Psychology or Neuroscience, available at universities in Italy and abroad.

The CN2 course will enable students to acquire the knowledge and competences required to conduct both basic and applied research in Psychology and Medicine, with special reference to neuropsychology and neuroimaging. In particular, the CN2 course will provide academic training for using software to analyse functional magnetic resonance images (e.g. SPM, Brain Voyager) and evoked potentials, as well as for using the Near-Infrared Spectroscopy (NIRS).

It also trains neuropsychology specialists who can assess psychic disorders and behavioural changes in neurological and psychiatric patients and provide prevention, care and rehabilitation for higher cortical functions affected by a range of pathologies, including congenital or acquired ones. This MD also trains professionals who can work in the Italian NHS (see current legislation), private services, professional consultancy and counselling, as well as in the prevention, diagnosis and treatment of cognitive disorders.

List of courses

First semester courses

1st year

	PROFESSOR	ECTS
Advanced Social Psychology And Social Neuroscience	To be defined	6
Affective Neuroscience And Psychopatology	Buodo	6
Clinical Neuropsychology	To be defined	6
Cognitive Neuroscience of Action	Castiello	6
Developmental And Aging Brain	Casco / Orrù	6
Developmental Cognitive Neuroscience	Simion	6
Human Electrophisiology	Bisiacchi	6
Learning Disabilities	Cornoldi / Zorzi	6
Neuroanatomy	De Caro	6
Neurolinguistics And Aphasiology	Semenza	6
New concepts in Cognitive Psychology	Zorzi	6
Principles of Cognitive Neuroscience and Neuroimaging Tecniques	Sartori / Vallesi	12
Trends in Neuroscience	Visiting Professor	6

2ndyear

	PROFESSOR	ECTS
Clinical Physiopathology	To be defined	6
Neurology	To be defined	6
Neurosurgery	D'Avella	6
Psychiatry And Psychopharmachology	Favaro / Tenconi	6
Statistics For Brain And Cognitive Sciences	Vidotto	6

CONTENTS OF COURSES
ACADEMIC YEAR 2014-2015[1]

[1] **The Course Programs are still liable to some changes**

Advanced Social Psychology and Social Neuroscience

Professor: To be defined

Phone number:

e-mail:

website:

Responsible department:

Degree course code and year: CN2, 1st year

Main field of study: Social Psychology, M-PSI/05

Credit points: 6

Lecture hours: 42

Semester: II

Contents

During this course we will study diverse social psychological phenomena that have been examined in the context of neuroscience, with particular attention to decision-making, aggressive behavior, status, dominance, and racial bias/discrimination. In doing so we will (1) study diverse systems that are involved in the study of social neuroscience (structural, endocrinological, neurotransmitter); (2) critically consider the methodological approaches used to study the associations between neurological systems and social behaviors/attitudes; and (3) evaluate the theoretical contributions of these approaches and studies. Students will be expected to develop critical scientific reasoning skills, in addition to a knowledge base in this area.

Expected learning outcomes

Students will be expected to develop a broad understanding of diverse methodologies used to study the neurologic basis of social and affective psychology. Students will develop critical skills for evaluating studies across these areas of social psychology, including the theoretical inferences derived from the methods and designs used.

Required Knowledge

Students should have taken at least one social psychology course. Students should also have a good knowledge of English, as the class will be conducted in English.

Form of instruction

Lectures focus on theories and empirical research. Students are encouraged to participate during lectures with questions and discussion. In addition to lectures, approximately 10 hours will be dedicated to discussing research articles presented by students.

Readings

1) Lessons/Slides

2) Articles: Packet of Articles will be made available at the first lecture.

Suggested/Not Required: Harmon-Jones, E., & Beer, J. S. (Eds.). (2009). Methods in Social Neuroscience. New York: Guilford Press.

Examination modes

25% - presentation of research articles (“Defense” of articles)

25% - presentation of research articles (“Critique” of articles)

50% - written exam

Affective Neuroscience and Psychopathology

Professor: Giulia Buodo

Phone number: 049/8277476

e-mail: giulia.buodo@unipd.it

Responsible department: Department of General Psychology - DPG

Degree course code and year: M1B, 1st year

Main field of study: Clinical Psychology (Psicologia Clinica, M-PSI/08)

Credit points: 6

Lecture hours: 42

Semester: II

Contents

Affective Neuroscience: general framework.
Research methods in Affective Neuroscience.
The neural basis of fear, reward and aggression.
Anxiety and Depression.
Psychopathy.
Schizophrenia.

Expected learning outcomes

The course will provide an introductory overview of the field of Affective Neuroscience and research methods in this field, with a thorough account of the neural basis of fear, reward and aggression. Then, course topics will cover the contributions of Affective Neuroscience to the understanding of psychopathology, with reference to anxiety and mood disorders, psychopathy and schizophrenia.

Required Knowledge

It is assumed that students have adequate knowledge on the structure and functions of central and peripheral nervous system, and on general psychopathology (acquired over the course of the first three years of study).

Form of instruction

Frontal lessons will cover the course topics with the aid of audiovisuals. Participation in class discussions will be highly recommended. Students will then move on to a thorough study of the course contents using the indicated textbook and reviews.

Readings

Dalgleish, T., Dunn, B.D., Mobbs, D., Affective Neuroscience: past, present and future. Emotion Review, 1, 355-368. --: --, 2009.

Berntson, G.G., Cacioppo, J.T., Handbook of Neuroscience for the Behavioral Sciences. --: --, 2009. Chapters 37, 39, 40, 41, 54, 55, 56, 57

Siegel, A., Victoroff, J., Understanding human aggression: New insights from neuroscience. International Journal of Law and Psychiatry, 32, 209-215.. --: --, 2009.

Ochsner, K.N., Silvers, J.A., Buhle, J.T., Functional imaging studies of emotion regulation: a synthetic review and evolving model of the cognitive control of emotion. Ann. N.Y. Acad. Sci.: 1251, E1-E24, 2012.

Course material will be available at the Faculty library ("Centro stampa").

Examination modes

The exam includes a written test in English, with multiple-choice, true/false, and open questions.

Other information

Exam registrations by proxy will not be accepted.

Clinical Physiopathology

Professor: To be defined

Phone number: --

e-mail: --

website: --

Responsible department:

Degree course code and year: CN2, 2st year

Main field of study: MED/09

Credit points: 6

Lecture hours: 42

Semester: II

Contents

Expected learning outcomes

Required Knowledge

Form of instruction

Readings

Examination modes

Other information

--

Clinical Neuropsychology

Professor: Sara Mondini

Phone number: 049 827.6641

e-mail: sara.mondini@unipd.it

website: --

Responsible department: Department of General Psychology - DPG

Degree course code and year: CN2, 1st year

Main field of study: Clinical Psychology (Psicologia clinica, M-PSI/08)

Credit points: 6

Lecture hours: 42

Semester: II

Contents

- Clinical neuropsychology: General issue (Medical chart, neurological examination, Laboratory testing in Neuropsychology, Neuroimaging and clinical neuropsychological Practice, Bedside examination)
- Neuropsychology and the human life span (Age related memory impairment, Late-life depression, Dementias)
- Neurological disorders (Assessment of movements and demyelinating, Cerebrovascular disease, Traumatic brain injury, Neurotoxicology)
- Neurological syndromes (Amnestic syndrome, Neglect syndrome, Agnosia, Limb apraxia, clinical evaluation of visual perception and constructional ability, Disorders of attention, Frontal lobe function and dysfunction).

Expected learning outcomes

Neuropsychologists involved in a clinical (hospital) setting require specialized knowledge in developing tailored, hypotheses-driven approaches for the assessment of patients with a broad range of common neuropsychological disorders. This course trays to uncovers the professional issues that clinical neuropsychologists deal with daily, including neurogenerative disorders, acquired disorders, ethical practice issues, interviewing, testing, prognosis and treatment planning. Using case studies culled from clinical work, the course provides students with firsthand accounts of neuropsychology in action integrating practical applications of neuropsychology, including the assessment, diagnosis, and treatment of individuals with brain illness or injury, as opposed to examining brain structures and functions per se. This application-based approach to neuropsychology wants to give students a clear, comprehensive understanding of what applied neuropsychology is and what clinical neuropsychologists do.

The course is aimed to give students the knowledge about 1) principal symptoms and signs of patients affected by focal brain damage or brain diseases 2) how to evaluate them and 3) how to plan the rehabilitative treatment.

Required Knowledge

No exams is preliminary required, however the knowledge of bases of neuropsychology is expected.

Form of instruction

Regular lessons, laboratory studying video with patients with neuropsychological disorders or practice activity with neuropsychological tests.

Readings

Snayder P.J., Nussbaum P.D., Robins, D.L., Clinical neuropsychology (A pockey handbook for assessment) Secon Edition. Washington: America Psychological Association, 2011.
Chapters:
Part I: 1,2,3,4,5
Part II: 8,9,10
Part III: 11,12,14,15
Part IV: 19, 20, 21, 22, 24, 25.

Examination modes

Written examination, multiple choice executed at the computer

Other information

--

Cognitive Neuroscience of Action

Professors: Umberto Castiello

Phone number: 049/8276659

e-mail: umberto.castiello@unipd.it

Responsible departments: Department of General Psychology, (Dipartimento di Psicologia Generale - DPG)

Degree course code and year: CN2, 1st year

Main field of study: Psychobiology (Psicobiologia e psicologia fisiologica, M-PSI/02)

Credit points: 6

Lecture hours: 42

Semester: II

Contents

A brief history of motor neuroscience.
Cellular and molecular basis of motor control.
Structural and functional anatomy of motor control.
Methods in motor neuroscience: the contribution of kinematical and neuroimaging techniques to the study of motor functions .
Basic principles of social actions.
Comparative motor neuroscience: examples from social interactions tool use and other motor abilities.

Expected learning outcomes

The first part of this course will provide the student with the basic principles underlying the neural organization of movement together with a full understanding of how such principles are modulated by cognitive processes, cross-modal interactions and social contexts. The second part of the course will provide the student with basic principles of neurology concerned with motor nervous system disorders.

Required Knowledge

Knowledge concerned with basic principles of biology, physics and mathematics is requested.

Form of instruction

Frontal lectures will provide the theoretical underpinnings of the treated issues. Furthermore a direct laboratory experience dealing with various paradigms and phenomena related to motor control is foreseen.

Readings
Electronic material discussed during each lecture. Scientific papers referring to the treated material.

Examination modes
The exam consists of a set of multiple-choice questions. An oral examination is possible when required by the Professor or by the Student upon completion of the written exam.

Other information
--

Developmental and Aging Brain

Professor: Clara Casco / Graziella Orrù

Phone number: 049/8276611

e-mail: clara.casco@unipd.it

Responsible department: Department of General Psychology

Degree course code and year: CN2, 1st year

Main field of study: General Psychology (M-PSI/01)

Credit points: 6

Lecture hours: 42

Semester: I

Contents

The course consists of an introductory part in which I will address some basic concepts of plasticity in the developing brain. In particular, I will focus on neurogenesis and neural migration during prenatal development, on the phenomenon of "rise and fall" of postnatal brain development, i.e. dendritic arborisation , axons growth, synapses growth , and on the basic aspects of plasticity in the adolescent and aging brain.

In the second part of the course I will develop further some fundamental concepts of neural plasticity, namely, mechanisms of neural plasticity and cortical reorganization, activity dependent neural plasticity, experience expectant plasticity, experience dependent plasticity.

In the third part of the course I will focus on two methods to induce plasticity in the human brain: perceptual learning and transcranical current stimulation

In the fourth part of the course I will describe the anatomical and neurophysiological bases of plasticity in the dorsal and ventral pathway of visual and auditory system as well as the development and aging of Magnocellular and parvocellular functions. This introductory session will be used as a framework to describe the plasticity phenomena in the developing and aging sensory system. In particular, for the developing sensory system, I will describe the effect of missing visual experience on cortical development and the Long-term effects of hearing lost in infancy. For the aging sensory system I will develop in detail the majors issues of neuropathology and sensory decline, plasticity mechanisms to compensate sensory decline and reversal of cognitive decline by inducing positive plasticity in sensory system.

Expected learning outcomes

1. Learn functional consequences of central sensory system pathology.
2. Utilize the principles of perceptual learning and neural plasticity in their approach to treatment.
3. Learn the relationship between assessment and treatment in clinical reasoning.

4. Learn to appreciate the importance of appropriate outcome measures to support evidence based practice.

Required Knowledge
None in particular.

Form of instruction
The course consists of frontal lessons (70%) and lab classes for the remaining 30%.

Readings
Huttenlocher P.R., Neural Plasticity. The Effects of Environment on the Development of the Cerebral Cortex.. Harward: Harward University Press, 2009.

Examination mode:
Written.

Other information
The slides will be available at the end of the course.

Developmental Cognitive Neuroscience

Professor: Francesca Simion

Phone number: 049/8276522

e-mail: francesca.simion@unipd.it

website: cprg.psy.unipd.it/regolin.htm

Responsible department: Department of Developmental and Social Psychology (Dipartimento di Psicologia dello Sviluppo e Socializzazione DPSS)

Degree course code and year: CN2, 1st year

Main field of study: M-PSI/04

Credit points: 6

Lecture hours: 42

Semester: II

Contents

The first part of the course will be devoted to a theoretical introduction to the main topics of developmental cognitive neuroscience and the second part will be devoted to Practical seminars and to practical labs. More specifically the students will have the opportunity to attend at the Eye tracker Lab and at the Evoked Potential Lab.

Expected learning outcomes

How genetic and environemental factors interact during the course of development to shape the brain, mind and behaviour and the origin of brain specialization will be the main topic of the lessons. By investigating both typical and atypical development the course will review how developmental cognitive neuroscience research can inform a variety of practical applications such as earlier diagnosis and more effective treatment of developmental disorders.

Required Knowledge

The students are required to know Developmental and General Psychology as well as Cognitive Neuroscience.

Form of instruction

Some practical methodological seminar will integrate the theoretical lessons.
The students are required to attend at practical laboratories during which the main tecniques to collect data will be presented.

Readings

Johnson, De Haan, Developmental Cognitive Neuroscience. UK: Oxford University Press, 2011.

Examination modes

Written examination with open questions. If the number of students is limited the examination might be oral.

Other information

During the course the students have to read specific papers and to prepare oral presentations.

Human Electrophisiology

Professors: Patrizia Bisiacchi

Phone number: 049/8276609

e-mail: patrizia.bisiacchi@unipd.it

website: cng.psy.unipd.it/ - colab.psy.unipd.it

Responsible department: Department of General Psychology (Dipartimento di Psicologia Generale - DPG) - Department of Developmental and Social Psychology (Dipartimento di Psicologia dello Sviluppo e Socializzazione DPSS)

Degree course code and year: CN2, 1st year

Main field of study: Psychobiology (Psicobiologia e psicologia fisiologica, M-PSI/02)

Credit points: 6

Lecture hours: 42

Semester: II

Contents

Unit I (28hours): EEG methods and application during the life-span and in clinical diagnosis. It will be introduced the class to basic technical aspects of the EEG recording and analysis technique, and their use in clinical diagnosis.

Unit II (14 hours;): EEG and event-related designs in Cognitive Neuroscience. It will be illustrated how EEG data can be used to disclose fine-grained processing architectures subtended in the execution of a range of cognitive tasks.

Expected learning outcomes

The course provides an in-depth introduction to methodological, theoretical, and clinical aspects subtended in the use of human electroencephalography (EEG) as a tool to monitor online event-related human cognitive processing during the life-span and its pathological aspects. The training during the course includes a phase of direct use of electroencephalographic recordings and preliminary data analysis.

Required Knowledge

No formal prerequisites for attending the course are required. However basic knowledge of anatomy and physiology of CNS are necessary.

Form of instruction

Teaching methods will consist of lessons in class and organized meetings in electroencephalographic laboratories

Readings

Steven J. Luck, An Introduction to the Event-Related Potential Technique. --: MIT PRESS, 2005.

Luck, S. J., & Kappeman, E. S., Event-related potential components. New York: Oxford University Press., 2012.

Students will receive further information about the selection of chapters in the manuals during the lessons.

Examination modes

Written and oral. Multiple choice and open questions.

Other information

--

Learning Disabilities

Professors: Cesare Cornoldi, Marco Zorzi

Phone number: 049/8276603 (prof. Cornoldi) - 049/8276618 (prof. Zorzi)

e-mail: cesare.conoldi@unipd.it , marco.zorzi@unipd.it

website: wmlabs.psy.unipd.it (prof. Cornoldi Lab), ccnl.psy.unipd.it (prof. Zorzi Lab)

Responsible department: Department of General Psychology (Dipartimento di Psicologia Generale - DPG)

Degree course code and year: CN2, 1st year

Main field of study: General Psychology (M-PSI/01)

Credit points: 6

Lecture hours: 42

Semester: II

Contents

The Course intends to promote knowledge and clinical skills on the neural and cognitive bases of learning disabilities. Assessment and intervention procedures will be presented and the students will be involved in practical activities.

1. Definition and identification procedures.
2. Assessment of reading, writing and mathematics. Neuropsychological assessment.
3. Types of intervention.
4. Non-verbal learning disorder, intellectual functioning, comorbidity with ADHD.
5. Computational and neural models of reading and calculation.
6. Cognitive and neural bases of dyslexia.
7. Cognitive and neural bases of dyscalculia.

Expected learning outcomes

Knowledge of the cognitive, emotional and neuropsychological mechanisms underlying LD and the main procedures of assessment and intervention.

Required Knowledge

Knowledge of Cognitive Psychology and on Psychological Assessment Principles.

Form of instruction

Frontal lectures and practical exercises.

Readings

C. Hulme & M. Snowling, Developmental Disorders of Language Learning and Cognition, Chichester, UK: Wiley-Blackwell, 2009. Chapters: 1 (Understanding developmental cognitive disorders), 2 (Reading Disorders I: Developmental Dyslexia), 3 (Reading Disorders 2: Reading Comprehension Impairment), 4 (Specific language impairment), 5 (Mathematics disorder) 7 (Attention Deficit Hyperactivity disorder).

A series of papers published in international Journals that will be provided during the course.

Examination modes

Written exam with open questions.

Other information

--

Neuroanatomy

Professors: De Caro

Phone number:

e-mail:

website:

Responsible department:

Degree course code and year: CN2, 1st year

Main field of study: BIO/16

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Expected learning outcomes

Required Knowledge

Form of instruction

Readings

Examination modes

Other information

--

Neurolinguistics and Aphasiology

Professor: Carlo Semenza

Phone number: 049/8214360

e-mail: carlo.semenza@unipd.it

Responsible department: Department of Neuroscience (Dipartimento di Neuroscienze)

Degree course code and year: CN2, 1st year

Main field of study: Neuropsychology of Language, M/PSI-02

Credit points: 6

Lecture hours: 42

Semester: I

Contents

The history of aphasia and classic aphasiology. The classic clinical assessment. The classic aphasia syndromes. Primary progressive aphasia. The cognitive approach and the contribution of linguistics: methodological issues.

Disorders of phonology. Supra-segmental and segmental level (phonetic and phonemic); error classification. The production level. The receptive level.

Lexical disorders. Neuropsychologically-based cognitive models of lexical functions.

Morphosyntactic disorders. Agrammatism and Paragrammatism. Lexical access of complex words: Inflection, derivation and compounding.

Semantic disorders. Semantic memory and the peripheral lexicons. Category and modality specific phenomena. Access vs. storage. Semantic dementia.

Disorders of reading and writing. Number processing and numerical abilities in aphasia.

Anatomical localization of language functions. The anatomo-clinical correlation method, Electrophysiological methods and Neuroimaging studies.

Expected learning outcomes

Advanced notions on neuropsychology of language and ability to assess aphasic disturbances.

Required Knowledge

Basic notions of neuroanatomy, neurophysiology, neuropsychology and psycholinguistics.

Form of instruction

Lectures, seminars and clinical demonstrations.

Readings

Denes G., Talking Heads: The Neuroscience of Language. Hove: Psychology Press, 2011.

Learning material will be distributed (review articles and clinical protocols).

Examination modes

Individual, Oral.

Other information

--

Neurology

Professors:

Phone number:

e-mail:

website:

Responsible department:

Degree course code and year: CN2, 2st year

Main field of study: MED/26

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Expected learning outcomes

Required Knowledge

Form of instruction

Readings

Examination modes

Other information

--

Neurosurgery

Professors: To be defined

Phone number:

e-mail:

website:

Responsible department:

Degree course code and year: CN2, 2st year

Main field of study: MED/27

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Expected learning outcomes

Required Knowledge

Form of instruction

Readings

Examination modes

Other information

--

New Concepts in Cognitive Psychology

Professors: Marco Zorzi

Phone number: 049/8276618

e-mail: marco.zorzi@unipd.it

website: ccnl.psy.unipd.it/

Responsible department: Department of General Psychology (Dipartimento di Psicologia Generale - DPG)

Degree course code and year: CN2, 1st year

Main field of study: General Psychology (M-PSI/01)

Credit points: 6

Lecture hours: 42

Semester: I

Contents

An integrated approach to cognition aims at bridging the gap between various levels of analysis (from neurons to behaviour) and exploits recent advances in the development of formal models. Numerical cognition is used as a case study to show how human cognition is shaped by evolution, learning, and culture.

Topics: animal cognition; cognitive development; neural bases of cognition; cultural effects on cognition; embodied cognition; computational modeling of cognition.

Expected learning outcomes

The course presents an integrated approach to the study of cognition. Numerical cognition is used as a case study to show how multidisciplinary research spanning a variety of methods and subject populations offers a coherent and integrated path towards understanding how cognition is shaped by evolution, learning, and culture.

Required Knowledge

Introductory knowledge about cognitive psychology and cognitive neuroscience methods.

Form of instruction

Teaching is based on frontal lectures and discussion of research articles (small group presentation). Attendance to lectures is compulsory and active involvement is promoted.

Readings

Reading material available on Moodle platform:

- Lectures slides
- Scientific articles

Agrillo et al (2012). PloS One, 7(2), e31923.
Ansari (2008). Nature Reviews Neuroscience, 9, 278-291.
Berteletti et al (2010). Numerical estimation in preschoolers. Developmental Psychology, 46, 545-551.
Brannon (2006). In: J. Campbell (Ed), Handbook of Mathematical Cognition (chapter 6, pp. 85-107).
Göbel et al (2011). Journal of Cross-Cultural Psychology, 42, 543-565.
Dehaene et al (2003). Cognitive Neuropsychology, 3, 487-506.
Feigenson et al (2004). Trends in Cognitive Sciences, 8, 307-314.
Halberda et al. (2008). Nature, 455, 665-668.
Hubbard et al (2005). Nature Reviews Neuroscience, 6, 435-448.
Nieder & Dehaene (2009). Annual Review of Neuroscience, 32,185–208.
Piazza et al (2010). Cognition, 116, 33-41.
Pica et al (2004). Science, 306, 499-503.
Stoianov & Zorzi (2012). Nature Neuroscience, 15, 194-196
Umiltà et al (2009). Experimental Brain Research, 192, 561-569.

Examination modes

Type of examination: Written.
Written examination: Open questions + paper assignment.
Paper assignment: Each student will be required to write a 3-page essay (about 1000 words) that reviews and discusses some assigned scientific articles. The paper must be hand over on the day of the written exam. The grade given to the paper will weight for 1/3 of the final score.

Other information

--

Principles of Cognitive Neuroscience and Neuroimaging Tecniques - MOD. A

Professor: Giuseppe Sartori

Phone number: 049/8276608

e-mail: giuseppe.sartori@unipd.it

Responsible department: Department of General Psychology (Dipartimento di Psicologia Generale - DPG)

Degree course code and year: CN2, 1st year

Main field of study: Psychobiology (Psicobiologia e psicologia fisiologica, M-PSI/02)

Credit points: 6 of 12

Lecture hours: 42 hours

Semester: I

Contents

Brief history of cognitive neuroscience.
Cellular and molecular basis of cognition.
Structural and functional anatomy of cognition.
Methods in Cognitive neuroscience: the contribution of neuroimaging techniques to the study of cognitive functions.
Development and plasticity.
The conscience issue.

Expected learning outcomes

At the end of the module, the students are expected to be familiar with neuroscientific approach to the study of cognitive functions.

Required Knowledge

Knowledge of brain anatomy and cognitive psychology. Basic knowledge of neuropsychology and clinical neuropsychology.

Form of instruction

Each topic will be introduced by the lecturer, by discussing the general issues relevant to that topic and the most interesting and recent experimental evidences reported in the literature.

Readings

Excerpts from:

- Ward, J. The Student's Guide to Cognitive Neuroscience. Psychology Press.
Recent scientific publications will be made available during classes.

Examination modes
Written and oral examination.

Other information
--

Principles of Cognitive Neuroscience and Neuroimaging Tecniques - MOD. B

Professor: Antonino Vallesi

Phone number: 049/8214450

e-mail: antonino.vallesi@unipd.it

website: people.sissa.it/~vallesi/

Responsible department: Department of General Psychology (Dipartimento di Psicologia Generale - DPG) – Vallesi's office is located at the Department of Neurosciences: SNPSRR, via Giustiniani 5, Padova.

Degree course code and year: CN2, 1st year

Main field of study: Psychobiology (Psicobiologia e psicologia fisiologica, M-PSI/02)

Credit points: 6 of 12

Lecture hours: 42

Semester: II

Contents

1. Neuroimaging techniques (functional magnetic resonance imaging, fMRI; near-infrared spectroscopy, NIRS):
    a) principles
    b) methodological issues
    c) data analysis and discussion
2. Brain stimulation techniques (transcranial magnetic stimulation, TMS; transcranial electrical stimulation, tES):
    a) principles
    b) methodological issues
    c) data analysis and discussion
3. Coregistrazion approaches (TMS-fMRI, EEG-fMRI)

Expected learning outcomes

At the end of the modules, the students will be able to design an fMRI study. They will also have a good knowledge of some of the hottest methodological and theoretical issues in neuroimaging, and will be able to apply their critical thinking when reading and evaluating fMRI studies.

Required Knowledge

Adequate knowledge of anatomy and principles of the nervous system. Basic knowledge of the main experimental paradigms in cognitive neuroscience.

Form of instruction

Classes will cover all the topics in their general aspects. Students will further explore the themes by using the textbook and the supporting material provided by the teacher (articles in English language).

Training classes will be devoted to practically deepen theoretical issues and (possibly) to simulate the final exam.

Readings

S. A. Huettel, A. W. Song, G. McCarthy., Functional magnetic resonance imaging.. Sunderland USA: SINAUER associates, 2004. Chapters: 2, 3, 5, 6, 7, 8, 10, 11, 12.

Walsh, V., Pascual-Leone, A., Kosslyn, S.M., Transcranial Magnetic Stimulation: A Neurochronometrics of Mind.. --: Bradford Books, 2005. Chapters 1-6.

Apart from the suggested chapters, other scientific articles will be pointed out during the classes.

Examination modes

Presentation and discussion of scientific articles in the classroom.

Multiple choice questions in the final written exam.

Other information

--

Psychiatry and Psychopharmachology

Professors: Favaro / Tenconi

Phone number:

e-mail:

website:

Responsible department:

Degree course code and year: CN2, 2st year

Main field of study: MED/25

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Psychopathology.

Etiopathogenesis, clinical and prognostic features, epidemiology, prevention, pathophysiology and neuropsychological and neuroimaging correlates, biological and psychotherapic treatments of the main psychiatric diseases:

- Delirium and Dementia
- Alcohol and substance abuse/dependance and correlated diseases
- Schizophrenia and schizophrenia-spectrum disorders
- Mood disorders.
- Anxiety disorders.
- Obsessive-compulsive spectrum disorders
- Dissociative disorders.
- Somatoform disorders.
- Suicidal behavior.
- Eating disorders: Anorexia nervosa and bulimia nervosa.
- Personality disorders.
- Psychiatric treatments and their organization.
- Biological treatments
- Psychotherapy in psychiatry

Expected learning outcomes

– Knowledge about biological, psychological and environmental bases of human pathological behavior and about main methods for psychiatric assessment.
– Knowledge of psychiatric diseases in adulthood and adolescence, as described in recognized diagnostic systems, such as DSM and ICD.

- Learning of diagnostic methods.
- Identification, knowledge and correct application of diagnostic instruments, including neuroimaging techniques (TAC, RMN, SPET E PET), neuroendocrinology, neuropsychology and neurophysiology.
- Knowledge of main treatments, including drugs, psychotherapy, remediation techniques, prevention interventions.
- Basic knowledge of psychopharmacology.
- Differential diagnosis.
- Knowledge about neuropsychological and structural/functional neuroimaging correlates of psychiatric diseases.

Required Knowledge

None.

Form of instruction

Frontal lessons. Clinical cases.

Readings

Slides and papers from the teacher.

Examination modes

Final examination consists in a written part (multiple choice and open questions) and 1-2 questions about the whole program

Other information

--

Statistics for Brain and Cognitive Sciences

Professor: Giulio Vidotto

Phone number: 049/8276683

e-mail: giulio.vidotto@unipd.it

website: zip2002.psy.unipd.it/

Responsible department: Department of General Psychology - DPG

Degree course code/year: CN2/1st year

Main field of study: Psychometrics (Psicometria, M-PSI/03)

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Matrix Algebra (an introduction). Simple Linear Regression: An algebraic and geometrical approach. Linear Models: Simple and Multiple Regression, Regression with Dummy Variables, ANOVA for Factorial Designs, Repeated Measures ANOVA, Analyses of Covariance, Contrasts and Multiple Comparisons. Generalized Linear Models (an introduction). Moreover, upon completion of the course the students should also be experienced in the use of the R Packages.

Expected learning outcomes

Linear statistical models for regression are widely used today in social, health, and psychological sciences. This course will provide the sound understanding of both the underlying theory and the practical problems required for the successful application of these models. The topics covered are multiple linear regression, analysis of variance (ANOVA), and generalized linear models.
Course objectives are: Understand the statistical foundation of the linear regression model and ANOVA including major distributions, diagnostics, variable selection; Understand how to interpret the results of regression analysis and ANOVA; Assessing the quality of the regression and ANOVA models.

Required Knowledge

Probability, random variables, descriptive and inferential statistics, confidence intervals, t-tests, F-tests, basic issues in experimental design. The students can easily find materials on Internet (e.g. a comprehensive list of prerequisites is provided by the course of Statistical Methods in Brain and Cognitive Science on the MIT website).

Form of instruction

The class will be run both with frontal lessons and laboratory practices. Students are expected to play an active role. During each class meeting, the first part will consist of frontal lectures (with the active participation of the students), whereas the last part will be dedicated to the critical discussion and the laboratory practices.

Readings

The slides to be used in the lectures and laboratory practices.
Julian J. Faraway (2005). Linear models with R. Chapman & Hall/CRC.
For further deepening:
George Henry Dunteman (1984), Introduction to Linear Models.
John Fox (1997). Applied Regression Analysis, Linear Models and Related Methods. Sage Publications.

Examination modes

The exam is divided into two parts: a lab exam, in which the student has to write-execute simple R programs (according to given specifications), and finally interprets the statistical results; with a written part, in which the student has to respond to few asked questions. The oral examination is a discretionary part of the evaluation.

Other information

--

Trends in Neuroscience

Professor: Visiting Professor

Phone number:

e-mail:

website:

Responsible department:

Degree course code/year: CN2/1st year

Main field of study: Neuropsychology of Language, M/PSI-02

Credit points: 6

Lecture hours: 42

Semester: I

Contents

Expected learning outcomes

Required Knowledge

Form of instruction

Readings

Examination modes

Other information

--

Course manager (Tutor) CN2
cdl.cn2@unipd.it

CN2 Facebook Group
https://www.facebook.com/groups/369231889865915/

Other links

International Office Psychology
erasmus.psicologia@unipd.it
tel. + 39 (0) 49 8276163
fax + 39 (0) 49 8276489
via Venezia, 8 - 35131 Padova, Italy
Facebook Group https://www.facebook.com/groups/87806826669/
Officer in charge Mrs. Sara Pellegrini
sara.pellegrini@unipd.it

School of Psychology website
http://www.psicologia.unipd.it