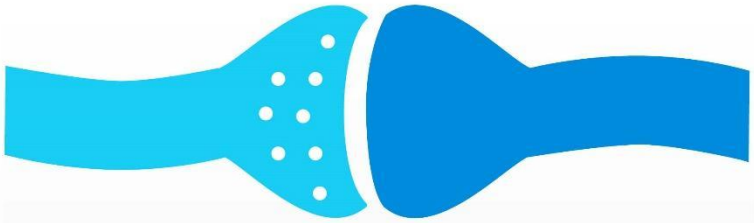
Advanced training courses of the

PhD program in Neuroscience

PHD PROGRAM IN
NEUROSCIENCE



NEUROSCIENZE
DOTTORATO DI RICERCA

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Doctoral School of the

University of Milano-Bicocca

School of Medicine and Surgery

Academic Year 2020/2021

The **PhD program in Neuroscience** is an interdepartmental, multisite enterprise based at the School of Medicine and Surgery of the University of Milano-Bicocca and its mission is to provide an environment of excellence for training in research based on the coexistence and cooperation of Italian and International Universities, Hospital-based research centers, Pharmaceutical Industry with a strong vocation to innovation and a European research center with unique opportunities in the field of X-ray imaging and irradiation.

This mission is pursued through the interaction between researchers and clinicians, who work in academic or industrial reality, and that belong to all the areas that constitute the more modern concept of the "world of Neuroscience".

Strong commitment to international collaboration and the development of joint research programs allowing a period of study/research in partner laboratories distributed in the most prestigious foreign universities are cornerstones of the program. With the aim to increase the international impact of our PhD program, a joint doctoral program with the University of Surrey (UK) has also be launched, in the context of an agreement between the University of Milan-Bicocca and the University of Surrey that will enable students enrolled in this specific track to obtain a "dual PhD", ie the title will be issued by both the universities.

To achieve its goals, the PhD program is organized in 3 tracks:

- Experimental Neuroscience
- Clinical Neuroscience
- International Neuroscience Track

Find out more here:

http://www.neuroscienze.medicina.unimib.it/

Contact us at dottorato.neuroscienze@unimib.it

Academic year 2020/2021

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The courses are independent and cross-curricular. PhD students can arrange their own schedule according to their personal interests and background.

Due to the COVID-19 emergency, practical courses with hands-on or clinical activities could be canceled while in-presence seminarial courses could be switched to online courses. Please read carefully the information provided in the courses' description.

To sign up for the courses, please follow the instructions provided by e-mail or contact dottorato.neuroscience@unimb.it if you are not a student of the PhD program in Neuroscience.

SUMMARY OF THE COURSES

**Available as NENS Cluster training course (online)*

1. GENETIC BASES OF INTELLECTUAL DISABILITY*

**Available as NENS Cluster training course (online)*

Teacher	**Angela Bentivegna**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Genetic bases of intellectual disability**
Language	English
CFU	1
Hours	8
Program	To give a comprehensive overview of genetic abnormalities that cause or contribute to intellectual disability (ID). Objectives of the course are: (a) known genetic causes of ID; (b) the divergent neurodevelopmental phenotypes associated with mutations in some genes; (c) the inheritance patterns observed for the susceptibility to ID, including highly penetrant Mendelian patterns, oligo/polygenic modes of transmission, and sporadic cases due to de novo mutations.
Evaluation:	YES
Calendar	May-June 2021. In case it will not be possible to hold lessons in presence, the course will be online. The course will be activated with a minimum of 7 participants.

2. GLIAL CELLS IN HEALTH AND DISEASE*

**Available as NENS Cluster training course (online)*

Teacher	**Anna Maria Colangelo**, Department of Biotechnology and Biosciences, University of Milano-Bicocca
Title	**Glial cells in health and disease**
Language	English
CFU	1
Hours	8
Program	To give a comprehensive overview of the role and function of glial cells in brain function. Objectives of the course are: Brain metabolism and neuro-metabolic coupling Alteration of glial function in neurodegenerative disorders
Evaluation:	YES
Calendar	June 21-22 and 28-29, 2021, 2 p.m. – 4 p.m. (can be adjusted if necessary). In case lessons can not be held in presence, the course will be online. The course will be activated with a minimum of 3 participants.

3. PATHWAYS, BIOMARKERS AND NEW THERAPIES IN NEURODEGENERATIVE DISORDERS*

**Available as NENS Cluster training course (online)*

Teacher	**Carlo Ferrarese**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Pathways, biomarkers and new therapies in neurodegenerative disorders**
Language	English
CFU	1
Hours	8
Program	To present current translational research on pathways and biomarkers for early diagnosis and new targeted therapies , the course will focus on: molecular mechanisms of neuronal damage (protein misfolding, excitotoxicity, oxidative stress, neuroinflammation) biomarkers in patients new therapeutic trials based on biomarkers
Evaluation	YES
Calendar	June 2021. In case it will not be possible to hold lessons in presence, the course will be online.

4. NEUROINFLAMMATION*

**Available as NENS Cluster training course (online)*

Teacher	**Maria Foti**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neuroinflammation**
CFU	1
Hours	8 hrs
Program	In this course, the diverse and complex interactions between the brain and the immune system from the perspective of current, cutting-edge research papers will be explored. The course will provide an extensive knowledge of the role of inflammation in nervous system health and disease. Inflammation is involved in many central nervous system (CNS)-regulated physiological processes (including energy balance, sleep, memory and synaptic plasticity), and is a key host defence response to acute and chronic peripheral and central disorders. Research into neuroinflammation is a major field that aims to develop new therapeutic interventions to treat all major nervous system disorders including stroke, brain trauma, epilepsy, Alzheimer's disease and neuropathies. This unit will cover the important role of inflammatory molecules as key mediators of CNS functions and will provide basic knowledge on the pathogenesis of, and inflammatory responses to acute and chronic nervous system disorders. The students will be able to: 1. Explain how the immune system and cellular brain components contribute to neurological disease 2. Describe the types and effector functions of resident and peripheral immune cells in the human brain, in health and disease
Evaluation	Each student will prepare a presentation based on recent topic research papers. Critical reading and presentation skills will be evaluated.
Calendar	The course will be activated with a minimum of 6 students and will be scheduled in September. Lectures will be organized using the webex Platform in case it will not be possible in presence.

5. FOOD AND BRAIN: YIN AND YAN

Teacher	**Paola Palestini**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Food and brain: Yin and Yan**
Language	Italian
CFU	1
Hours	8
Program	In this cycle of seminars will be presented: • The principle of heath nutrition • The relation between food and SNC development • The good food for nervous system • The bad food for nervous system Online Lectures by WEBEX
Evaluation	YES
Calendar	To be determined according to the overall teaching plan. The course will be activated with a minimum of 5 participants

6. THE CONCEPT OF STAMINALITY IN NEUROSCIENCE*

**Available as NENS Cluster training course (online)*

Teacher	**Arianna Scuteri**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**The concept of staminality in neuroscience**
Language	English
CFU	1
Hours	8
Program	To clarify the "stemness" concept for the Nervous System and to explore the stem cell potential for research and therapy, the following topics will be addressed: • The stem cell features • The stem cells in the Nervous system: neurogenesis • Methods to potentiate endogenous neurogenesis • From stem cells to neurons: therapeutic approaches.
Evaluation	YES
Calendar	September 2021 The course will be activated with a minimum of 6 participants. According to the Covid-19 emergency, the lessons could be given on-line.

7. NEUROGENETICS

Teacher	**Lucio Tremolizzo**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neurogenetics**
Language	Italian
CFU	1
Hours	8
Program	With the purpose of learning principles of neurogenetics, i.e. genetic applied to neurological and psychiatric disorders, the corse will address the following topics: Principles of genetics applied to the field of neuroscience Behavioral and cognitive phenotypes Motor phenotypes I (strength) Motor phenotypes II (quantity/quality of movement)
Evaluation	YES
Calendar	21/05/2021 h 14.00-18.00 - 28/05/2021 h 14.00-18.00. The course will be held online (WebEx) if lessons in presence will not be allowed.

8. THE PRINCIPLES OF 3RS IN BIOMEDICAL STUDIES*

**Available as NENS Cluster training course (online)*

Teacher	**Gabriella Nicolini**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**The principles of 3Rs in biomedical studies**
Language	English
CFU	1
Hours	12
Program	The course is aimed at introducing the student to the 3R principles (Replacement, Reduction & Refinement) in the biomedical studies and to provide basic and applied knowledge on the experimental models and instruments to be applied in the experimental research. The course will consist of 5 seminars: -The 3R principles in the legislation regarding the animal experimentation: the European directive 2010/63 and the Italian DL 26/14. (Dott. Crippa) -Statistical methods applied to the determination of the study dimension in lab experiments: theoretical and practical aspects (free software G-power). (Prof.ssa Antolini) -Development of QSAR in silico models for the studies on the relationship between structure and molecular properties. (Prof. Ballabio) -In vitro methods for studying complex diseases, like tumours, basing on engineered cellular models, spheroids, organoids. Examples on the in vitro methods available for reducing the number of animal in in vivo experimentation applied to tumours genetic. (Proff. Nicolis e Chiaradonna) -Vertebrate experimental models alternative to mammals: the use of zebrafish and Xenopus laevis in developmental biology and toxicology (Prof. Mantecca)
Evaluation	NO
Calendar	May-June 2021 If the Covid 19 emergency continues, the lessons will be held through the WebEx platform

9. ANIMAL MODELS OF HUMAN DISEASES IN NEUROSCIENCE*

**Available as NENS Cluster training course (online)*

Teacher	**Paola Marmiroli,** Department of Biotechnology and Biosciences, University of Milano-Bicocca
Title	**Animal models of human diseases in neuroscience**
Language	English
CFU	1
Hours	8
Program	Main points of the lectures: • Reasons why the use of animal models is critical for scientific research and problems associated with animal experimentation. • Evaluation of the different kinds of animal models and examples of established models, with particular regard to the most commonly used animals in biomedical research: the laboratory mouse and rat. • Description and analysis of animal models of some specific human diseases. The aim of the teaching is to explain how the use of animal models could improve our knowledge of human diseases, evaluate the problems connected with the management of animal models and with the extrapolation of data from animals to humans.
Evaluation	YES - Multiple choice test
Calendar	September, 2021 Participants (min/max): minimum 4 N.B.: For students attending the I and II year of the PhD program In case of impossibility to provide lessons in presence due to COVID-19 or other, these will be made available online.

10. META-ANALYSES IN NEUROSCIENCES: AN INTRODUCTION

Teacher	**Giuseppe Carrà and Collaborators**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Meta-analyses in neurosciences: an introduction**
Language	English
CFU	1
Hours	8
Program	The aim of the course is to acknowledge basic principles and procedures of commonly used methods for meta-analysis following both PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and MOOSE (Meta-analysis of Observational Studies in Epidemiology) guidelines. The topics addresses in the course are: Introduction to epidemiology in neurosciences Different measures of association for results synthesis in meta-analysis The publication bias issue Risk of bias and quality assessment
Evaluation	YES
Calendar	To be determined according to the overall teaching plan. The course will be activated with a minimum of 3 participants and is limited to 10 participants. This course is an hands-on workshop and can’t be hold online.

11. DEVELOPMENT OF DIAGNOSTIC METHODS FOR THE EVALUATION OF THE RESPONSE TO TREATMENTS IN PRECLINICAL MODELS OF GLIOMA*

**Available as NENS Cluster training course (online)*

Teacher	**Silvia Valtorta**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Development of diagnostic methods for the evaluation of the response to treatments in preclinical models of glioma**
Language	English
CFU	1
Hours	8
Program	In this course the fundamentals of research and diagnostic applications of clinical and preclinical imaging will be explored. In particular, the role of imaging in the monitoring of therapy response in glioma will be discussed. The program will focus on - Molecular glioma classification - Neuroinflammation and glioma - Creation of preclinical models of glioma - Fundamentals of imaging techniques - Study of tumor heterogeneity using imaging (PET, MRI, OI) - Use of imaging methods for therapy response
Evaluation	YES
Calendar	May-June 2021, in case of problems the course will be remote (meet, skype, etc..)

12. NON-INVASIVE BRAIN STIMULATION TECHNIQUES IN COGNITIVE NEUROSCIENCE*

**Available as NENS Cluster training course (online)*

Teacher	**Leonor Josefina Romero Lauro**, Department of Psychology, University of Milano-Bicocca
Title	**Non-invasive brain stimulation techniques in cognitive neuroscience**
Language	English
CFU	2
Hours	16
Program	The mechanism of action of three non-invasive brain stimulation techniques: TMS, tDCS and TMS-EEG The use of TMS, tDCS and TMS-EEG for research purposes in the field of cognitive neuroscience Practical class on tDCS: setting and choosing the stimulation parameters, electrodes montage, electrode positioning according to the 10-20 EEG system. Practical class on TMS: setting and choosing the stimulation parameters, determining the resting motor threshold, using the neuronavigation system to guide coil positioning, Practical class on TMS-EEG: setting and choosing the stimulation parameters, using the neuronavigation system, collecting one session of TMS-Evoked potentials (TEPs), hints on TEPs data analysis
Evaluation	YES
Calendar	April, May or June 2021. The course will be activated with a minimum of 5 participants and is limited to 10 participants. In case lessons in presence can not be done, the course will be online and the practical part will be omitted

13. BASIC MECHANISM OF EPILEPSY*

**Available as NENS Cluster training course (online)*

Teacher	**Giulio Sancini**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Basic Mechanism of Epilepsy**
Language	English
CFU	1
Hours	8
Program	The goal is to equip students with the knowledge they need to understand the fundamental concepts underlying current research in the neurophysiology of central circuits and neurological disorders characterized by recurrent epileptic seizures. Lectures will allow students to learn how to identify interesting biological issues and feasible approaches to address the questions. Topics of the course are: experimental work will introduce the student to the main electrophysiological research techniques, structure and function of ion channels, generation and propagation of action potential, neuronal firing properties, physiology of synaptic transmission and onset of the recurrent hypersynchronous discharge: persistent neuronal changes and circuitry rearrangements.
Evaluation	YES
Calendar	June 2021. The course will be activated with a minimum of 2 participants. Due to the current Covid-19 health emergency, the course could be held remotely only (via Distance Learning)

14. NEUROPSYCHOPHARMACOLOGY*

**Available as NENS Cluster training course (online)*

Teacher	**Laura Musazzi,** School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neuropsychopharmacology**
Language	English
CFU	1
Hours	8
Program	The course is focused on the neural basis of normal and pathological behavior, which includes psychiatric diseases such as mood and anxiety disorders, chronic psychotic illnesses, and addictions. While emphasizing an understanding of basic mechanisms that can be targeted pharmacologically or genetically to influence brain function, the program also brings a translational component linking these mechanisms to psychiatric disorders.
Evaluation	YES
Calendar	May-June 2021 If the Covid 19 emergency continues, the lessons will be held through the WebEx platform

15. NEUROPSYCHOLOGY AND DEMENTIAS: ENTRY COURSE

Teacher	**Ildebrando Appollonio and Collaborators**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neuropsychology and dementias: ENTRY COURSE**
Language	Italian
CFU	2
Hours	24
Program	- Foundations of Neuropsychology - The Dementia syndrome - The Neuropsychological Examination - Cognitive Aging and Alzheimer's Disease - Memory and Amnestic syndromes - Executive functions, Fronto-Temporal Degeneration and ALS - Focal and Degenerative Aphasias - Lewy Body Dementia, - Acquired Alexia and Agraphia - Acquired Dyscalculia and Gerstmann's Syndrome,
Evaluation	NO (at least 75% of programmed hour frequency)
Calendar	6 consecutive Monday afternoons 2:30-6:30 pm, starting from April 12, 2021 Site: Classroom of the Neurology Ward, 5th floor, Sector A, HSG If teaching in presence will not be not possible, lessons will be delivered by remote streaming. Participants: minimum 1; max: 4

16. NEUROPSYCHOLOGY AND DEMENTIAS: ADVANCED COURSE

Teacher	**Ildebrando Appollonio and Collaborators**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neuropsychology and dementias: ADVANCED COURSE**
Language	Italian
CFU	2
Hours	24
Program	- Apraxia and Neuropsychology of Parkinson Plus syndromes (PSP, CBS) - Visuo-Spatial Deficits, Neglect and Posterior Cortical Atrophy (PCA) - The Agnosias: from focal lesions to Semantic Dementia (SD) - Vascular dementia (VAD) and Vascular Cognitive Impairment (VCI) - The Subclinical and Preclinical Phases of dementias (MCI, SCD) - Rapidly Progressive Dementias - Limbic Encephalitis and other Autoimmune dementias - Behavioral and Psychiatric Disturbances (BPSD) in the Dementias - Treatment of Non-AD Dementias - Current Therapies and Research Trials for Alzheimer's Disease
Evaluation	NO (at least 75% of programmed hour frequency)
Calendar	6 consecutive Monday afternoons 2:30-6:30 pm, starting from June 7th, 2021. Site: Classroom of the Neurology Ward, 5th floor, Sector A, HSG If teaching in presence not possible, remote lessons will be delivered Participants: minimum 1; max: 4 First level Neuropsychology and Dementias Course required

17. NEUROPSYCHOLOGY LAB

Teacher	**Ildebrando Appollonio and Cristina Mapelli**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Neuropsychology LAB**
Language	Italian
CFU	1
Hours	12
Program	Practical involvement in clinical neuropsychology and research Standard Psychometric Evaluations Draft of NPS Reports Experimental NPS Approaches
Evaluation: YES/NO	NO (at least 75% of programmed hour frequency)
Calendar	Date and Time: To be determined, according to Ph. D. overall teaching plan and NPS Lab availability (from April 2021). Site: Neuropsychology Lab, 5th floor, Sector A, HSG If physical presence not possible, the lab course will not be delivered Participants: minimum 1; max: 2

18. CLINICAL NEUROIMMUNOLOGY

Teacher	**Guido Cavaletti**, School of Medicine and Surgery, University of Milano-Bicocca
Title	**Clinical neuroimmunology**
Language	English
CFU	1
Hours	8
Program	The aim of this teaching activity is to introduce those students without a clinical background in neurology to the neurological examination and to the recognition of signs and symptoms of neuroimmunological diseases, with a focus on Multiple Sclerosis. Goals: • Understanding the basis of the neurological examination of the central nervous system • Assisting to an outpatient clinic activity as observers • Reporting in summary the results of a clinical assessment of real patients
Evaluation: YES/NO	YES (evaluation of the summary report)
Calendar	To be determined according to the overall teaching plan. The course is limited to 3 participants. If physical presence not possible, the clinical course course will not be delivered