Course Description

The course focuses on a highly integrated and multidisciplinary approach to the 'Brain, Mind and Body' system, characterised by excellence in the fields of research and education. The course is organised into the following subject areas: i) Neuroscience and neurological disorders (neurophysiology, neuropharmacology, neuroscience, developmental neurobiology, brain imaging, neurological pathophysiology, neurology, neuropathology, clinical neurophysiology, neurorehabilitation, experimental neurosurgery); ii) Psychological and psychiatric sciences (epidemiological psychiatry, psychiatric genetics, biological psychiatry, psychopharmacology, psychotherapy, analysis of predictors for the outcome of mental disorders; substance dependence, neuropsychology, cognitive, experimental, social and clinical psychology); iii) Movement sciences (determinants of motor performance, physiology of ageing; models for promoting exercise aimed at lifestyle modification). Furthermore, various research and teaching topics bridge the three areas and involve synergies between academic staff from multiple scientific disciplinary sectors (SSD) (e.g. the study of neurodegenerative diseases, using basic, pre-clinical and clinical research approaches). The training programme draws on the multidisciplinary expertise of the academic staff, which is of a high scientific calibre, and the availability of state-of-the-art laboratories, and aims to train researchers with a wealth of methodological, cultural and communication skills.

The research carried out within the PhD programme also aims to generate initiatives designed to improve environmental sustainability, accelerate digital transformation processes and promote social inclusion.

Upon completion of the programme, PhD students will be eligible for positions as research associates or postdoctoral researchers in national and international academic and healthcare research institutions, as well as in the research and development departments of national and international biomedical, pharmaceutical and diagnostic companies.

Course objectives

The main educational objective is to provide PhD students with the tools and skills necessary to carry out high-level research at universities, public bodies and private organisations.

In general, the programme aims to train students to design and carry out original studies based on the principles of 'hypothesis-driven' scientific research and 'evidence-based medicine'.

In particular, PhD students will acquire specific skills in:

A) The development and communication of a research project based on a solid understanding of the relevant scientific literature, underpinned by a strong cultural foundation and sound methodological principles, and carried out with appropriate planning of experimental designs and protocols in the fields of neuroscience, physiological sciences, cognitive sciences and clinical sciences;

To this end, the training programme of the PhD course includes:

- the refinement of skills in consulting bibliographic and scientific databases through practical workshops;
- the acquisition of fundamental concepts of scientific methodology relating to the types and planning of studies in the clinical, behavioural, cognitive, psychological and experimental fields;
- participation in drafting the application for authorisation from the institutional IRB, including an explanation of the principles underpinning ethical human experimentation and the preparation of the subject's informed consent;

B) Carrying out the individual experimental phases using the most advanced molecular, cellular, physiological, epidemiological, genetic, cognitive and psychological investigative techniques applicable to various experimental models (cells, in situ organs, laboratory animals and humans) under various conditions of environmental stress.

To this end, the training component of the PhD programme includes:

- Specific training, laboratory placements and participation in training courses in Italy and abroad on the use of the equipment required to carry out the project, including new diagnostic, laboratory and neuroimaging tools;

C) The conduct of clinical and epidemiological studies using the most advanced experimental methods (Phase III studies) and observational epidemiological methods (Phase IV studies), including specific training in meta-analytical tools for analysing data extracted from randomised trials and observational studies in accordance with the principles of evidence-based medicine.

To this end, the training programme of the PhD course includes:

- Specific training to acquire skills in clinical and epidemiological research methods;
- Specific training to acquire skills in meta-analytical research methods;
- Participation in specific monographic courses included in the teaching programme on innovative methods for the electronic management of clinical and epidemiological data;

D) Post-hoc analysis of experimental data.

To this end, the training programme of the PhD course includes:

- Specific monographic courses included in the curriculum on statistical methods for data analysis in the fields of experimental, medical, clinical and epidemiological sciences, relating to longitudinal studies and meta-analyses, and an introduction to the use of the most widely used statistical software packages across various operating systems (SPSS, NCSS, Statistica, STATA);
- Specialised courses providing an introduction to the use of development environments for quantitative data analysis (MATLAB, LabVIEW);

E) Effective and concise oral and written communication of experimental
results.

To this end, the training programme of the PhD course includes:

- Lab meetings for systematic reports on experimental work and data analysis;
- A written and oral presentation at the end of each year on the research project and the current state of the art in the field, followed by a discussion with experts;
- Participation in national and international conferences with presentations (posters or oral) on the results obtained during the project;
- Gradual acquisition of specific skills in the drafting of scientific reports and articles.
- Involvement in the drafting and peer review of scientific reports and articles.

Furthermore, the course aims to provide an overview of national and international funding opportunities, postdoctoral research, and European and international systems for the commercialisation of research results and intellectual property.

Finally, the course aims to raise awareness of the role of wellbeing at work in enhancing individual and team productivity, as well as to promote an ethical, transparent and collaborative approach to research.

Expected career and professional opportunities

These include: i) Postdoctoral fellow at national and international public and private research organisations; ii) Researcher in health and academic research laboratories in the field of neuroscience; iii) Researcher in R&D departments of pharmaceutical and biomedical companies; iv) Researcher within the National Health Service (SSN) and IRCCS; v) Consultant in epidemiological, clinical and pharmacological research; vi) Staff member responsible for highly specialised postgraduate training; vii) Level I manager at National Health Service (SSN) facilities. Of particular interest to local stakeholders are projects aimed at developing and evaluating the effectiveness of models designed to modify the behaviours and lifestyles of at-risk populations, people with motor and cognitive disabilities, and patients with neurological and psychiatric conditions, where recent experimental evidence has demonstrated the effectiveness of behavioural therapy based on exercise and physical training.

The contribution made by the implementation of epidemiological projects will also be significant; these will enable the monitoring of current practices within mental health services, in relation to the relationship between evidence and clinical decisions, data on effectiveness and efficiency, choices regarding pharmacological and psychosocial interventions, and their impact on clinical outcomes and disability.

Assessment methods

At the end of each year of the programme, each PhD student is required to present the progress of their research project and research pathway to the Academic Board (or a delegation thereof) in the form of an 'End-of-Year Seminar'.

This seminar must be delivered in English on the date and at the time notified by the programme secretariat and requires the presence of the supervisor and any co-supervisors, a first discussant identified by the PhD student in consultation with their supervisor, and a second discussant identified by the programme coordinator. Normally, each presentation should last approximately 20 minutes, plus 10 minutes set aside for discussion with the discussants.

Each discussant will be provided with a seminar evaluation form to complete and return following the presentation.

Subject to the funds available to the programme, one or more prizes will be awarded for the best presentation in each cycle.

Furthermore, each PhD student will be required to draw up an 'Annual Activity Report' and an 'Annual CFU Form' in accordance with the attached documents.

The timetable for the annual learning assessment activities is as follows:

- 1) by 31 July, each PhD student must send the following documents to the programme secretariat by email to irene.chierico@univr.it:
    - Annual Activity Report signed by the supervisor
    - Annual CFU Form signed by the supervisor
    - Title of the End-of-Year Seminar
    - Name of Discussant 1
- 2) By 10 September, the Programme Coordinator, with the support of the Programme Secretariat:
    - identify Discussant 2 for each PhD student
    - shall appoint the committees responsible for awarding prizes for the best presentations
    - shall communicate the final timetable for the End-of-Year Seminars to all those involved;
- 3) 15–29 September: the End-of-Year Seminars take place;
- 4) by 30 September:
    - the Discussants must submit the Evaluation Forms to the Course Secretariat
    - submission of the minutes of the committees responsible for awarding prizes for the best presentation to the course secretariat