UPC studies

MASTER'S DEGREE IN NEUROENGINEERING AND REHABILITATION (UPC-UAB)

ETSEIB
Barcelona School of Industrial Engineering

UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH

International Campus of Excellence

MASTER'S DEGREE IN NEUROENGINEERING AND REHABILITATION

93%
UPC graduate employment rate

Source: 2nd graduate employment survey of master's degree graduates of the Catalan universities by the Catalan University Quality Assurance Agency (AQU Catalunya)

+30
leading research groups are active at the Biomedical Engineering Research Centre (UPC) and the Institut Guttmann Neurorehabilitation Hospital (UAB)

36%
international mobility master's degree students at the ETSEIB

Neuroengineering is a discipline that aims to understand, repair, replace or enhance neural systems, including the restoration and augmentation of human function via human-machine computer interfaces between the nervous system and artificial devices.
Rehabilitation is a complex, highly specialised clinical and technical process aimed at restoring, minimising and/or compensating for the functional alterations of the person affected by a disability.

The master's degree in Neuroengineering and Rehabilitation offers an excellent opportunity to graduates of engineering bachelor's degrees to continue their specialisation or focus their career on this social need with a high health and economic impact. They will gain knowledge and skills related to neural engineering; sensory, brain and muscle systems; biomechanics; assistive technology; and cognitive, motor and cardiorespiratory therapies, among other fields.
This is an interuniversity master's degree: it emerged from the long collaboration on research, innovation projects and teaching between the Biomedical Engineering Research Centre (CREB) of the Universitat Politècnica de Catalunya (UPC) and the Institut Guttmann Neurorehabilitation Hospital (IG), an affiliated centre of the Universitat Autònoma de Barcelona (UAB).

Curriculum

This information may be subject to change.
Up-to-date information is available at upc.edu

90 ECTS credits

Delivery: face-to-face
Language: English, Spanish and Catalan
Teaching period: from mid-September to end of June
Places offered: 40

1st semester

Anatomy and Physiopathology	4.5
Rehabilitation Therapies	3
Rehabilitation Equipment	4.5
Biomedical Signals	4.5
Medical Image	4.5
Biomaterials	4.5
Modelling and Simulation of Biomedical Systems	4.5

2nd semester

Mobility Assistive Technologies	3
Human-Machine Interfaces	4.5
Neuromodulation and Neurostimulation	3
Data Analysis in Rehabilitation	4.5
Neuroimage	4.5
m-Health Systems	3
Virtual Reality and Serious Games	3
Biomechanics	4.5

3rd semester

Work Placement	18
Master's Thesis	12

Why choose this master's degree?

The master's degree provides rigorous training in the field of neuroengineering and rehabilitation and responds to the high demand for specialists in this field. This official master's degree is the only one of its kind in Spain.

Professional opportunities

The CREB and the IG are leaders in their respective sectors, which ensures that this master's degree provides students with multidisciplinary training and is adapted to new technologies and advances in the sector. The master's degree produces qualified professionals, of which there are currently still few in the field, who have a very high employment rate that enables them to easily adapt to positions of responsibility in hospitals, companies and research centres in the field of neuroengineering and rehabilitation. Graduates may also work as freelancers and entrepreneurs. Demand is particularly high in Catalonia, the University's area of influence, which is one of the most dynamic hubs in medical technologies in Europe.

Barcelona School of Industrial Engineering

The master's degree is coordinated by the Barcelona School of Industrial Engineering (ETSEIB), where most of the classes are taught. ETSEIB researchers and professors work with exoskeletons, prostheses, e-walkers, virtual reality, serious games, brain/human-machine interfaces, instrumentation, equipment, assistive robotics, m-health, etc. Thus, there are contents of computer graphics, electronics, biomedical signals, deep learning, robotics, vision, electronics, mechanics, etc., but they are oriented towards neuroengineering and rehabilitation rather than biomedical engineering in general.

Biomedical Engineering Research Centre

The academic staff of the master's degree are involved in different areas of the CREB, a research centre with more than 80 researchers who work in the following eight areas: Biomaterials; Biosignal Analysis for Rehabilitation and Therapy; Bioinformatics and Biomedical Signals; Dosimetry and Medical Radiation; Computer Graphics and Serious Games; Biomechanical Engineering; Robotics and Vision; and Instrumentation and eHealth.

Institut Guttmann Neurorehabilitation Hospital

The IG is a hospital specialised in the medical and surgical treatment and comprehensive rehabilitation of people with spinal cord injury, acquired brain injury and other neurological disabilities. Its characteristic care model is based on the intervention of an expert multidisciplinary team working in modern facilities and the continuous incorporation of the latest technology, leading it to become one of the world's most prestigious hospitals in its field. Its scientific activity aims to six research programs: Technologies for sensory-motor rehabilitation; Neuroreparation and advanced therapies; Neuropsychological rehabilitation and cognitive stimulation; Brain Health; Neuroestimulation and Neuromodulation; and Social research.

Work placement

The ETSEIB fosters and maintains strategic, wide-ranging collaborations with companies over the long term to promote education and research. In the field of education, more than 800 educational cooperation agreements are signed every year for external academic placements at more than 300 companies working in various fields.
In the last semester, the master's degree provides students with the opportunity to collaborate with a company or hospital in a real environment, with a prestigious research group or with another national or international research institution as they complete their master's theses.

Mobility programmes

The ETSEIB participates in international mobility programmes that allow students on the master's degree to spend a semester abroad, generally through the Erasmus programme for Europe.

MASTER'S DEGREE IN

NEUROENGINEERING AND REHABILITATION

A quality master's degree that opens a window to the world

Further information:
upc.edu/en/masters/neuroengineering-and-rehabilitation
escola.etseib@upc.edu

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Institut Guttmann

UAB Universitat Autònoma de Barcelona

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