Master Neuroengineering and Rehabilitation

2024-2025

www.upc.edu/masters-sessions

Now, UPC masters degrees!

Register to the information sessions
Master in Neuroengineering and Rehabilitation

1. UPC/ETSEIB introduction
2. Master Neuroengineering and Rehabilitation
3. Q & A
### UPC / ETSEIB

#### Key Figures

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estudients</td>
<td>29,812</td>
</tr>
<tr>
<td>PDI</td>
<td>3,523</td>
</tr>
<tr>
<td>PAS</td>
<td>2,074</td>
</tr>
<tr>
<td>Graus</td>
<td>65</td>
</tr>
<tr>
<td>Màsters</td>
<td>84</td>
</tr>
<tr>
<td>Programes de doctorat</td>
<td>45</td>
</tr>
<tr>
<td>Centers docents</td>
<td>18</td>
</tr>
<tr>
<td>Programes de formació permanent</td>
<td>275</td>
</tr>
<tr>
<td>Patents el darrer any</td>
<td>19</td>
</tr>
<tr>
<td>ingressos per R+D+I (2021)</td>
<td>348 M</td>
</tr>
<tr>
<td>Alumni</td>
<td>70,151</td>
</tr>
</tbody>
</table>

#### Departments and Programs

- **Departments**: 16
- **Institutes**: 2
- **Bachelor degrees (GETI, GETIAE)**: 2
- **Master’s programs**: 15
- **Students**: 3,379
- **Teaching and Research Staff (PDI)**: 446
- **Administrative and Support Staff (PAS)**: 126
ETSEIB: Escola Tècnica Superior d’Enginyeria Industrial de Barcelona

Over 170 years of educating professionals with a very strong scientific and technical foundation

https://etseib.upc.edu/
ETSEIB Master's degree programmes

1. Master's degree in Neuroengineering and Rehabilitation (with UAB)
2. Master's degree in Biomedical Engineering (with UB)
3. Master's degree in Automatic Control and Robotics
4. Master's degree in Automotive Engineering
5. Master's degree in Management Engineering
6. Master in Nuclear Engineering / EMINE
7. Master in Electric Power Systems and Drives
8. Master in Thermal Engineering / DENSYS
How to apply

(https://etseib.upc.edu/en/Academic%20programmes/academic-procedures/acces/application-msc-programmes)

- **Application**
  Deadline: 13th of May 2024

- **Acceptance (Academic Comission)**
  June 2024

- **Provisional listing of accepted students**
  Before the end of June 2024

- **Students' acceptance**
  Up to 7 days from the publication of the listing

- **Definitive listing of accepted students**
  Mid-July 2024

- **Enrolment**
  Check information at website etseib.upc.edu
How to apply

(https://etseib.upc.edu/en/Academic%20programmes/academic-procedures/acces/application-msc-programmes)

How to apply:

Apply UPC Admissions:

Application

To validate the request, it is necessary to complete the information for every field:

- Personal data
- Academic details
- Required documentation

Required documents

- Application (*) (choose 3 specialty options for the master required)
- Data protection
- Pre-enrolment fees (General information about UPC on this page)
Admission and enrollment process

Pre-enrollment in the application:
1. Processing
2. Payment to be confirmed
3. Send

PAYMENT of 300€
(ADVANCED PAYMENT OF ENROLMENT FEES)

Welcome session

Acceptance of the place

Submission of original documents and delivery of copies

Enrollment on line or in person

Start of the Master’s degree

Please, check that all the required documentation has been submitted

documentation review

validation of complete applications

Admission
/Publication of the provisional list of applicants admitted

objection/appeal period

Admission
/Publication of the final list of applicants admitted

objection/appeal period

Start of the Master’s degree
Master in Neuroengineering and Rehabilitation

Coordinator: Miquel Angel Mañanas
(miguel.angel.mananas@upc.edu)
MNER: Topic

- **Neuroengineering** is a discipline to understand, repair or enhance neural systems: restoration and augmentation of human function via human-machine computer interfaces between nervous system and artificial devices.

- **Rehabilitation** is a highly specialized clinical & technical process aimed at restoring and/or compensating for the functional alterations of the person affected by a disability.
Master in Neuroengineering and Rehabilitation

- The master’s degree in Neuroengineering and Rehabilitation (MNER) offers an excellent opportunity to bachelor’s graduates with basic background on engineering to continue their specialization or to focus their career in this social need with high health and economic impact.

- The courses of this master’s program provide knowledge and skills related to neural engineering; sensory, brain and muscle systems; biomechanics; assistive technology; and cognitive, motor and cardiorespiratory therapies, among others.
This is an interuniversity master’s degree: it emerged from the long collaboration on research, innovation projects and teaching between

Research Centre for Biomedical Engineering (CREB) from the Universitat Politècnica de Catalunya (UPC)

Institut Guttmann Neurorehabilitation Hospital, an affiliated centre of Universitat Autònoma de Barcelona (UAB).

Neurosciences Institute, from the UAB
Neurorehabilitation Hospital Guttmann Institute

1. Physical rehabilitation

2. Neuropsychological rehabilitation

3. Disability management (prevention, comorbidity, care)

4. Brain Health and Aging

5. Social
Neurorehabilitation Hospital Guttmann Institute

- 90 ECTS
  (shared with UAB – Guttmann Institute Neurorehabilitation Hospital- Neurosciences Institute)
- 30 places
- **Main backgrounds:** Industrial Engineering, Physics Engineering, Industrial Electronics and Automatica Engineering, Biomedical Engineering.
- **Secondary background:** Electronic Systems, Telecommunications Systems and Electronics, Computer Science, Electrical/Electronic/Mechanical Engineering, Physics, among others (possible Complementary Training).
- **Objective:**
  Train professionals in a multidisciplinary manner with a high level of competencies, which allows them to adapt and facilitate responsibility work groups in hospitals, companies or research centers in the field of neuroengineering and rehabilitation, and the technology that is associated.
### MNER: Curriculum

#### 1st semester
- Anatomy and Physiopathology: 4.5
- Rehabilitation Therapies: 3
- Mobility Assistive Technologies: 4.5
- Biomedical Signals: 4.5
- Medical Image: 4.5
- Biomaterials: 4.5
- Modelling and Simulation of Biomedical Systems: 4.5

#### 2nd semester
- Rehabilitation Equipment: 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
# MNER: Curriculum

<table>
<thead>
<tr>
<th>First Semester (September-January)</th>
<th>Second Semester (February-June)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomy and Physiopathology</strong> (4.5 credits)</td>
<td><strong>Biomechanics</strong> (4.5 credits)</td>
</tr>
<tr>
<td><strong>Rehabilitation Therapies</strong> (3 credits)</td>
<td><strong>Virtual Reality and Serious Games</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>Mobility assistive technologies</strong> (4.5 credits)</td>
<td><strong>m-Health Systems</strong> (3 credits)</td>
</tr>
<tr>
<td><strong>Biomedical Signals</strong> (4.5 credits)</td>
<td><strong>Data Analysis in Rehabilitation</strong> (4.5 credits)</td>
</tr>
<tr>
<td><strong>Medical Images</strong> (4.5 credits)</td>
<td><strong>Neuroimage</strong> (4.5 credits)</td>
</tr>
<tr>
<td><strong>Biomaterials</strong> (4.5 credits)</td>
<td><strong>Human-Machine Interfaces</strong> (4.5 credits)</td>
</tr>
<tr>
<td><strong>Modeling and Simulation of Biomedical Systems</strong> (4.5 credits)</td>
<td><strong>Neuromodulation and Neurostimulation</strong> (3 credits)</td>
</tr>
</tbody>
</table>

| Third Semester (September-January)                                                              |                                                                                               |
| **Work placement** (18 credits)                                                                 | **Rehabilitation Equipment** (3 credits)                                                       |
Why choose this Master’s Degree?

- This provides rigorous training in the field of Neuroengineering and Rehabilitation and responds to the high demand for specialists in this field.

- In spite of existing these studies abroad, mainly in the US and UK, this official master’s degree is the only one in Spain.
Why choose this Master’s Degree?

- Researchers and professors at CREB and IG are leaders in their respective sectors, which ensure that this master’s degree provides students with multidisciplinary training and is adapted to new technologies in the sector.

- This also trains qualified professionals, currently still few in the field and with a very high occupancy rate, and enables them to easily adapt to positions of responsibility in hospitals, companies or research centres.

- Graduates can also work as freelancers and entrepreneurs. There is particularly a high demand in Catalonia, the University’s area of influence, which is one of the most dynamic hubs in medical technologies.
Barcelona School of Industrial Engineering (ETSEIB)

- The headquarters of the CREB are at **the ETSEIB, where most of the lectures will be taught** by experts from many departments who work in exoskeletons, 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., oriented towards NER rather than BME in general.
In addition

- This master's degree provides the opportunity to collaborate during the last semester with a company or a hospital in a real environment, with a research group, or other national and international research institutions completing the Master's Degree Dissertation.
- The ETSEIB allows students to spend a semester abroad, generally through Erasmus program for Europe.
- After completing the master's degree, you can directly access the Biomedical Engineering doctorate program at the UPC (3 years of doctoral thesis, without complementary training). Industrial doctorate is also possible by companies in the sector.
Work Placement and Final Master Thesis
... further information

FAQ’s

Check the most frequently asked questions in this document.

International Relations and Admissions Office

Face-to-face opening office hours:
from Monday to Friday 11 am to 1:30 pm
and Tuesday 3.00 pm to 17.30 pm
Information request: https://demana.upc.edu/etseib/

📞 +34 93 401 59 27
Thank you for your attention

admissions.etseib@upc.edu