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Universidad  
del País Vasco

Euskal Herriko  
Unibertsitatea



With the support of the  
Erasmus+ Programme  
of the European Union

**Erasmus Mundus Master**

# MASTER ON INNOVATIVE MICROWAVE ELECTRONICS AND OPTICS – EMIMEO

University of Limoges / University of the Basque Country /  
Aston University / University of Brescia

[www.ehu.eu](http://www.ehu.eu)

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## INTRODUCTION & OBJECTIVES

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EMIMEO offers a programme centred on microwave engineering and photonic technologies which ensures that students acquire advanced and cross-disciplinary expertise.

EMIMEO has been selected by the European Commission in the framework of the Erasmus Mundus Joint Master Degree (EMJMD) 2018 call.

The project's partners are the University of Limoges (UNILIM, France), the University of Brescia (UNIBS, Italy), the Aston University (UK), and the University of the Basque Country (UPV/EHU, Spain). The associate

partner University of Cluj-Napoca (Romania) will also contribute to the learning programme. A panel of 15 industrial Associated Partners, including SMEs, large companies and associations, will support the EMIMEO programme through concrete contributions and will constitute an effective network for Master's theses with the prospect for future career development.

EMIMEO project is one of these educational projects which will boost the attractiveness of science, technology and engineering.

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## ENTRY PROFILE

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- Bachelor diploma in Electronic Engineering, telecommunication engineering, or applied physics with solid bases in signal processing, electromagnetism, telecommunications, embedded systems, analogue and digital electronics, propagation of electromagnetic waves and principle of photonics – [Final grade of the 3 years bachelor's Programme. Applicants can convert their grade through the enic-naric recognition convention or Unesco].
- Previous professional experience (industrial internship, academic project, summer jobs) and/or research experience: the applicant has to justify a cumulative work experience of 4 weeks with a positive assessment.
- 3 reference letters from persons having reasonable knowledge of the candidate skills and potentials.
- Study curriculum – List of the 180 acquired ECTS.
- Marks of all university exams for the bachelor's Programme.
- A motivation letter / cover letter.
- Publications (e.g. internship reports) relevant to the contents of the Master Programme.
- Foreign language skills.

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## CAREER OPPORTUNITIES

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In a context of an increasing demand of research and industrial applications around these topics, EMIMEO Masters is a concrete solution to improve the number of highly qualified students for feeding the research labs and for meeting the demand of the industrial sector. EMIMEO is a thoroughly integrated programme with a jointly

developed curriculum. Areas covered range from the fundamentals of microwave electronics and photonics to their implementations with new technologies in wired and wireless communications, moving from components to system architectures for communication systems and networks.

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## ABOUT THE COURSE

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### Teaching place:

The Master study programme is divided into four semesters of 30 ECTS each. The EMIMEO Consortium releases multiple degrees and recognises any teaching module attended in other institutions of the Consortium. Students will receive the diploma from each institution in which they will have spent at least 1 semester of study.

- UNILIM: Master Physique appliquée et Ingénierie physique/Master in Applied Physics and Physical Engineering
- UNIBS: Master in Communication Technologies and Multimedia
- UPV/EHU: Master in Ingeniería física (EMIMEO Masters Degree)
- ASTON: Master in Telecommunication Systems

**Teaching language:** English.

**Approximate fees:** For EU students participation costs come to 4 500€ per year. For non-EU students participation costs come to 9 000€ per year. Remind that for Erasmus Mundus scholarship holders this cost is covered by the scholarship.

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## TEACHING LOAD

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| <u>Compulsory subject courses</u><br>60 Credits ECTS | <u>Optional subject courses</u><br>30 Credits ECTS | <u>Research Projects</u><br>30 Credits ECTS | <u>Total</u><br>120 Credits ECTS |
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## TRAINING SYLLABUS

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As a graduate of the EMIMEO Master, students will have thorough scientific knowledge from analogue microwave electronics and photonics. According to the European Credit Transfer System (ECTS), a two-year master's program is worth 120 ECTS (60 ECTS per year, 30 ECTS per semester).

### Year 1:

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#### Semester 1 (Univ. Limoges, France)

- Basics of active and nonlinear electronics
- Foundations of electromagnetic wave propagation
- Fundamentals of coherent photonics
- Optoelectronics (provided by UTCN)

#### Semester 2 (Univ. Brescia, Italy)

- Microwave engineering
- Wireless system laboratory
- Nanophotonics
- Practical chemistry for nanotechnology
- Optical communication networks
- Optical communication components
- Antennas
- Research and industrial week in CLUJ (organized by UTCN)

### Year 2:

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**Semester 1:** Choose among four alternatives

**Semester 2:** Devoted to Master thesis in any of EMIMEO member or associated partners

#### S1 at Univ. Limoges, France

- Antennas and EM compatibility for RF systems
- Passive components and devices for RF systems
- Nonlinear components and devices for RF systems
- Printed electronics for telecom and energy harvesting
- Telecom systems and networks
- Advanced photonic sources and systems

#### S1 at Univ. Basque Country, Spain

- RF and microwave measurement techniques
- RF and microwave power components
- Instrumentation and control for RF and microwave facilities
- Noise and interferences
- Sensors and sensors systems
- Hardware/software advanced digital electronic systems
- Software tools for system analysis and design
- Control techniques for complex and distributed systems
- Introduction to data science
- Introduction to research methodology

#### S1 at Univ. Brescia, Italy

- Nanotechnologies
- Remote sensing
- Electronics for telecommunications
- Tutored projects
- Digital modulation channel coding

#### S1 at Univ. Aston, United Kingdom

- Telecommunication networks and quality of service
- Radio systems and personal communication networks
- Digital communication and information theory
- Pervasive and mobile communication networks
- Project management

**Year 2, semester 2: Master thesis**

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## CONTACT

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For any queries, please contact [emimeo-application@unilim.fr](mailto:emimeo-application@unilim.fr) and check the Erasmus+ FAQ page.

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## PARTNERS

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<http://www.erasmus-master.emimeo.eu/>



<http://go.ehu.eus/erasmusmasteremimeo>

