PARTNERS

1. Ikerlan
2. Jema
3. Vicomtech
4. Ariadna Instruments S.L.
5. Irizar e-Mobility
6. CEIT
7. CAF Power
8. Orona
9. Nexeya France
10. CENER
11. ZIV Aplicaciones Tecnología, S.L.
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18. Ormaizabal
19. Fundación Hidrógeno Aragón
20. Epic Power Converters S.L.
22. EDF Recherche et Developpement
23. Total Solar
24. Goiener
25. I.Ener
26. Enargia
27. Vinci-energies
28. Pragma Industrie
29. Usurbilgo Lanbide Heziketa and Tknika
30. eXDCi Solutions S.L.
### INTRODUCTION & OBJECTIVES

This master's degree has been designed in conjunction with a large number of companies and several research centres in order to ensure a high placement rate.

The master's degree has several special features:
- 40 ECTS in collaboration with companies.
- The main language of instruction is English.
- Classes taught in 2 centres: Faculty of Engineering of Gipuzkoa (Donostia-San Sebastian and Elbar) and ESTIA Institute of Technology (Biarritz, 30 min from Donostia-San Sebastian).
- Possibility of a double-degree programme with ESTIA Institute of Technology.

The aim of this master's degree is to train specialists to model, simulate, control, operate and manage smart grids and distributed generation.

This master's degree will allow students to:
- Acquire high-level skills, allowing them to be recruited quickly.
- Acquire practical experience thanks to the intensive collaboration with companies.
- Master English, which has become an essential language with which to grow professionally.
- Have the possibility of carrying out a PhD.
- Contribute to a sustainable economic and social development.

### ENTRY PROFILE CAREER OPPORTUNITIES

The degrees that give access to the master's degree are:
- Degree in Renewable Energy Source Engineering
- Degree in Electrical Engineering
- Degree in Industrial Electronic Engineering & Automatics
- Degree in Industrial Technology Engineering
- Other equivalent university degrees (at the discretion of the academic committee).

Graduates will be able to work as designers, project managers, researchers or maintenance managers in the sector of renewable energies and power systems, of course, but also in others sectors such as electro-mobility, machine tools, etc.

### TRAINING SYLLABUS

#### Compulsory subjects:
- Introduction to Smart grids 3 ECTS
- Grids Operation and Control 3 ECTS
- Communications in Smart grids 3 ECTS
- Power Converters 3 ECTS
- Modelling and Control of Storage Systems and Associated Converters 3 ECTS
- Disturbances and Protections in Smart grids 3 ECTS
- Control of the Machine-Side Converter-Generator Set 4.5 ECTS
- Dynamic Modelling of Distributed Generation Sources 4.5 ECTS
- Component Connection to the Grid by DC/AC Converters 3 ECTS
- Demand Side Management (DSM) 3 ECTS
- Implementation of Smart grids Control Algorithms 3 ECTS
- Modelling and Control of Renewable Generation Farms and Participating with Ancillary Services 3 ECTS
- Seminars and Visits 3 ECTS
- Application to Concrete Projects 6 ECTS

#### Optional subjects:
- Research Methodology 3 ECTS
- Industrial Informatics 3 ECTS
- Introduction to the Electric Power System 3 ECTS
- Modelling and Control of Wind Turbines 3 ECTS
- Fuzzy logic. Application to microgrids 3 ECTS

#### Internship and Master Thesis:
- Internship 18 ECTS
- Master Thesis 12 ECTS

### ABOUT THE COURSE

**Teaching place:** Faculty of Engineering - Gipuzkoa  
Ecole Supérieure des Technologies Industrielles Avancées (ESTIA)  
(Biarritz, France)

**Teaching type:** On-site.

**Teaching language:** English. Spanish, Euskera and French are also possible in 36 ECTS

**Approximate fees:** 4,050-4,250 €

**Calendar:**
- First quarter: September to December
- Second quarter: January to April
- External Internships and Master Thesis Project: 6 to 8 months months between May and December

The schedule is adjusted each year taking into account all the important restrictions.

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**STUDY LOAD**

<table>
<thead>
<tr>
<th>Compulsory subject courses</th>
<th>Optional subject courses</th>
<th>Internship and Master Thesis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>51 ECTS credits</td>
<td>9 ECTS credits</td>
<td>30 ECTS credits</td>
<td>90 ECTS credits</td>
</tr>
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</table>

**Total:** 90 ECTS credits
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**Total:** 90 ECTS credits

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**Internship and Master Thesis:**
- Internship
- Master Thesis

**Total:** 90 ECTS credits

**Compulsory subject courses:**
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- Dynamic Modelling of Distributed Generation Sources: 3 ECTS
- Component Connection to the Grid by DC/AC Converters: 3 ECTS
- Demand Side Management (DSM): 3 ECTS
- Implementation of Smart grids Control Algorithms: 3 ECTS
- Modelling and Control of Renewable Generation Farms and Participating with Ancillary Services: 3 ECTS
- Seminars and Visits: 3 ECTS
- Application to Concrete Projects: 6 ECTS

**Optional subject courses:**
- Research Methodology: 3 ECTS
- Industrial Informatics: 3 ECTS
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