



## *Training Guide*

### 1. Subject information

NAME	Electrical Energy and Cooperation for Development		CODE	EMSTEP01-2-014 (MCEESP02-2-007)
DEGREE	Erasmus Mundus Master Course in Sustainable Transportation and Electrical Power Systems	CENTER	University of Oviedo	
TYPE	Compulsory	TOTAL ECTS	2 (3)	
PERIOD	Semestral (3 <sup>rd</sup> term)	LANGUAGE	English	
COORDINATORS		TELEPHONE / EMAIL		LOCATION
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TEACHERS		TELEPHONE / EMAIL		LOCATION
Jorge Coque Martínez		<a href="mailto:coque@uniovi.es">coque@uniovi.es</a> 34-985182108		Department of Business Management. University of Oviedo.
Arthur Williams		<a href="mailto:arthur.williams@nottingham.ac.uk">arthur.williams@nottingham.ac.uk</a> Xt 68684		Department of Electrical & Electronic Engineering. University of Nottingham.

### 2. Contextualization.

In the beginning of the third term of the master program, this subject will aim to introduce the students into the problems of development that technologies and, in particular, electric power systems solve, or generate. For such purpose, first, we will lay out the basis of cooperation for development and its links with technology and energy; then, some real projects of rural electrification in poor countries will be shown. The methodology, both practical and participatory, is coherent with a continuous evaluation, without final exams.

### 3. Requirements.

There are no special requirements applied to this subject because it belongs to the third term, therefore the students will already have an in-depth technological knowledge to attend it. In fact,



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the aim is not to gain a greater depth in this knowledge but to widen their understanding by looking at other perspectives on social consequences of its use, especially on the most disadvantaged population. Therefore, more than previous formation, people who are analytical and have social sensibility as well as technological knowledge are required.

#### 4. Competences and Learning outcomes.

This subject is related to the competences below, all of them included in the master verification report:

- Project design and management in the scope of the master's topics. [BL1]
- Writing, communicating and presenting scientific documents to specialists, within the scope of the contents of the Master Degree (electric power systems, hybrid and electrical vehicles and renewable energies). [BL2]
- Critical sense, respect for the diversity and social focus of the professional activity related to the management of the energy. [SL24]
- Comprehension of the links between development and energy sector technologies and businesses. [SL25]
- Analysis of concrete cases of basic need dissatisfaction and design of solutions based on electric power management systems. [SL26]

This subject is related to the basic learning results below, all of them included in the master verification report:

- RA124: Critical sense, respect for the diversity and social focus of the professional activity related to the management of the energy.
- RA125: Comprehension of the links between development and energy sector technologies and businesses.
- RA126: Analysis of concrete cases of basic need dissatisfaction and design of solutions based on electric power management systems.

More specifically, students will be able to acquire a supportive and global vision of the reality, complementing the conventional technical learning with ethical principles that should guide their professional career, which includes skills as follows:

- Analytical sense with respect to the diversity and social focus of the professional activity related to the management of energy.
- Comprehension of the links between development and energy sector technologies and businesses.
- Analysis of concrete cases of basic need dissatisfaction and design of solutions based on electric power management systems.

#### 5. Contents.

Topic 1: **Development, cooperation and technology.**

- Concepts of development
- Cooperation for development: methods and agents
- Technologies for development
- Development project cycle

Topic 2: **Electric power systems to promote (or to prevent) development.**

- Energy and development



- Renewable energies
- Electric energies in the development
- Electric firms and development

Topic 3: **Projects of cooperation for the development with a high component of electric power.**

- Off-grid power - electrical energy in rural communities
- Technology Transfer
- Management models
- Donors and markets

Topic 4: **Practical cases.**

- Micro/pico hydropower in Kenya, Peru, Nepal
- Solar PV in tropical countries

## 6. Academic methodology and working schedule.

Reaching the objectives proposed above needs participatory methods that will take place in seminars combined with the practice based on the proposal of suitable solutions for specific contexts of cooperation for development.

In total there are 10 presential sessions of 1.5 hours, alternating lectures and seminars in the same classroom, devoted to develop practical exercises, and to discuss them.

Themes	Total hours	PRESENTIAL WORK							NON-PRESENTIAL WORK			
		Lectures	Class practice / Seminars	Laboratory practice / field / computer / languages	Clinic practice	Group Tutoring	internships	Evaluation Sessions	Total	Group work	Autonomous Work	Total
Development, cooperation and technology	20	3	3						6	7	7	14
Electric power systems to promote (or to prevent) development	4.5	1	0.5						1.5	2	1	3
Projects of cooperation for the development with a high component of electric power	13	2	2						4	5	4	9
Practical cases	12.5	2	1.5						3.5	5	4	9
<b>Total</b>	<b>50</b>	<b>8</b>	<b>7</b>						<b>15</b>	<b>19</b>	<b>16</b>	<b>35</b>

MODES		Hours	%	Total
Presential	Lectures	7.5	50	15
	Class practice / Seminars	7.5	50	
	Laboratory practice / field / computer / languages			



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	<i>Clinic practice</i>			
	<i>Group tutoring</i>			
	<i>Internships (in external companies or institutions)</i>			
	<i>Evaluation sessions</i>			
Non-presential	Group work	19	54	35
	Autonomous work	16	46	
	Total	50		

The following table shows the proposed time schedule according to the ideas above.

Sessions	Topics
1 <sup>st</sup> to 5 <sup>th</sup>	1: Development, cooperation and technology. 2: Electric power systems to promote (or to prevent) development.
6 <sup>th</sup> to 10 <sup>th</sup>	3: Projects of cooperation for the development with highly component of electric power. 4: Practical cases.

In total there are 15 presential sessions of 1.5 hours, alternating lectures and seminars in the same classroom, devoted to develop practical exercises, and to discuss them.

Themes	Total hours	PRESENTIAL WORK							NON-PRESENTIAL WORK			
		Lectures	Class practice / Seminars	Laboratory practice / field / computer / languages	Clinic practice	Group Tutoring	internships	Evaluation Sessions	Total	Group work	Autonomous Work	Total
Development, cooperation and technology	40	6	6						12	14	14	28
Electric power systems to promote (or to prevent) development	9.5	2	1						3	4.5	2	6.5
Projects of cooperation for the development with a high component of electric power	13	2	2						4	5	4	9
Practical cases	12.5	2	1.5						3.5	5	4	9
<b>Total</b>	<b>75</b>	<b>12</b>	<b>10.5</b>						<b>22.5</b>	<b>28.5</b>	<b>24</b>	<b>52.5</b>

	MODES		Hours	%	Total
Presential	<i>Lectures</i>		11.25	50	22.5
	<i>Class practice / Seminars</i>		11.25	50	
	<i>Laboratory practice / field / computer / languages</i>				
	<i>Clinic practice</i>				



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	<i>Group tutoring</i>			
	<i>Internships (in external companies or institutions)</i>			
	<i>Evaluation sessions</i>			
Non-presential	Group work	19	54	52.5
	Autonomous work	16	46	
	Total	75		

The following table shows the proposed time schedule according to the ideas above.

Sessions	Topics
1 <sup>st</sup> to 10 <sup>th</sup>	1: Development, cooperation and technology. 2: Electric power systems to promote (or to prevent) development.
11 <sup>th</sup> to 15 <sup>th</sup>	3: Projects of cooperation for the development with highly component of electric power. 4: Practical cases.

## 7. Evaluation of the student's training.

According to the aims and the style of this subject, its evaluation will be practical and continuous. As the program will develop, the students will be asked to present short projects and other practical tasks to be submitted and discussed in the sessions.

## 8. Resources, bibliography and additional documentation.

BP, 2013, *Statistical Review of World Energy*. [www.bp.com/](http://www.bp.com/)

DFID (Department For International Development), 2002, *Energy for the poor. Underpinning the Millenium Development Goals*. [www.dfid.gov.uk/](http://www.dfid.gov.uk/)

IEA, 2012. *World Energy Outlook 2015*. International Energy Agency, Paris.

NORAD, 1999. *The Logical Framework Approach (LFA). Handbook for Objectives-Oriented Planning*. Norwegian Agency for Development Cooperation, Oslo.

**Practical Action** (English NGO specialised in technologies for development):  
<http://practicalaction.org>

Practical Action, *Poor People's Energy Outlook series*. [policy.practicalaction.org/policy-themes/energy/poor-peoples-energy-outlook](http://policy.practicalaction.org/policy-themes/energy/poor-peoples-energy-outlook):

Poor People's Energy Outlook 2012: *Energy for Earning a Living*.

Poor People's Energy Outlook 2013: *Energy for Community Services*.

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UN-Energy, 2005. *The Energy Challenge for Achieving the Millennium Development Goals*. UN-Energy.



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UNDP. **Millennium Development Goals & Sustainable Development Goals.**

<http://www.un.org/millenniumgoals/>

WEA (**World Energy Assessment**). [www.undp.org/energy/activities/wea/](http://www.undp.org/energy/activities/wea/)

WEO (**World Energy Outlook**). [www.worldenergyoutlook.org/](http://www.worldenergyoutlook.org/)

WILLIAMS, A.A. and SIMPSON, R., 2009. **Pico hydro: reducing the technical risks for rural electrification.** *Renewable Energy*. 34(9), 1986-1991.

All these and other resources will be available through the Virtual Campus of the University of Oviedo.