

Development of Approaches to Harmonization of a Comprehensive Internationalization Strategies in Higher Education, Research and Innovation at EU and Partner Countries HARMONY

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> HARMONY Project meeting Tomar 16 – 21 April 2018

Erasmus Mundus Joint Master Course: a case of Success





POLITÉCNICO DE COIMBRA









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SAPIENZA UNIVERSITÀ DI ROMA

Erasmus Mundus Joint Master Course

Sustainable Transportation and Electrical Power Systems

120 ECTS



Sustainable Transportation and Electrical Power Systems Master Degree

Associated Universities and Companies

Associated Universities











Company	Sector	Country
ABB*	Electrical systems	ES/DE
EDP	Energy	PT/ES
E.ON	Energy	DE/UK
Ford Motor Company	Automobile	USA/DE
Gamesa Electric	Energy	ES/UK
HC Energía	Energy	ES
ISF (NGO)	Engineering	ES
REN	Electrical systems	PT
Schneider Electric**	Energy	ES/DE
Seat	Automobile	ES
Siemens	Electronics & electrical engineering	ES/DE
TRW Conekt	Engineering consultancy	UK
WEG	Electric Motors/Drives	РТ
Windtec	Wind turbine engineering	AT
Trainelec (CAF I+D)	Railway Industry	ES
General Electric Global Research	High-Power Electronics	DE
Alstom Transport	Railway Industry	FR

Associated companies



- Offers a highly specialized education in Electrical Engineering, focusing on two of the areas of the highest technological content and professional requirements in the energy sector.
- The main goal of the EMMC in "Sustainable Transportation and Electrical Power Systems" is the training of qualified staff in areas related to electrical energy management, emphasizing in power systems for renewable energies and electrical transportation.

- The course is structured in two academic years, distributed in four 30 ECTS semesters for a total student workload of 120 ECTS.
- The EMMC STEPS focuses on the three key areas of electrical energy engineering: Electrical Power Systems, Electrical and Hybrid Vehicles, Energy Efficiency and Renewable Energies but students can build their own curriculum based on their previous background and their professional interest

The Master specifically offers two study tracks: Sustainable Transportation and Electrical Power Systems.



Transportation and Electrical Power Systems



EMMC STEPS students will be studying in at least 3 EU countries.



Transportation and Electrical Power Systems



The programme also offers the opportunity of carrying out the internship and the preparation of the Master Thesis in a fourth different country, eventually outside the EU (America/Asia).

- The Master Thesis may be supervised by a PhD Professor belonging to any of the partner Universities and jointly supervised by a professor or tutor from the associated organization (University or company) where the student is carrying out the internship.
- Graduates successfully completing the EMMC STEPS academic programme will be awarded with a Joint Master Degree in Sustainable Transportation and Electrical Power Systems (STEPS) by all the Consortium universities, <u>fully recognized in the four partner</u> <u>countries</u>





During the first two weeks students will attend an <u>Introductory course</u> at the **University of Oviedo**. They will be introduced to the objectives, methodology and operational aspects of the programme. Students will also be introduced to the coordinators in each of the University and will have the opportunity to meet Master colleagues.





Semester 1 is conceived as a <u>Levelling Course</u>, in order to compensate knowledge for different educational background. Students wishing to focus on Sustainable Transportation strand will spend this first period in the **University of Rome**, while the focusing on Electrical Power Systems will attend lectures in the **Polytechnic Institute of Coimbra - ISEC**.





Semester 2 courses will be devoted to the study of advanced subjects on Sustainable Transportation and Electrical Power Systems at the **University of Nottingham**. Students will choose among ten different topics to focus the learning process either on Sustainable Transportation or Electrical Power Systems.





During **Semester 3** students will complete their specialization in either of the two proposed strands at the **University of Oviedo**. In Sustainable Transportation, topics are designed to cover both the electrical and mechanical considerations in the design of hybrid/electric vehicles and the integration of these new actors in the electrical network. Power Systems subjects include topics related to the management of electrical power systems, including development of renewable energy projects and sustainable development.





Finally, **semester 4** will offer the opportunity of carrying out a professional internship in any one of the world leading companies associated to the Master or in a partner or associated University, and a guided research aimed at the preparation of the Master thesis.

The Master thesis will be related to one of the main lines identified as keystones in the Master: Electrical Power Systems, Electrical and Hybrid Vehicles, Energy Efficiency and Renewable Energies. The internship period will be closely linked to the thesis topic.



Electrica	Kick-off cours	se	Oviedo	Any institution,
Power	at Oviedo. Ba	sic Nottingham		including other
Systems	skills at Coiml	bra		institutions.
	Power Electronics converters Control of Electromechanical systems Digital Control Power Systems Power Plants Distribution systems Electrical machines DSP and communications Microcontrollers	FACTS and Distributed Generation (Renewable Generation Technologies) Renewable Generation Technologies and Control Power Quality and EMC Technologies for Wind Generation Advanced AC Drives	Smartgrids and Microgrids Applied simulation to power systems Power Systems Laboratory Electrical Markets Project Management Economical and Financial Analysis	Master's Thesis Internships



Sustainable Transportation Kick-off course at Oviedo. Basi skills at Rome	e ic Nottingham	Oviedo	Any institution, including other institutions.
Mechanical background Dynamic analysis of AC machines Control of Electromechanical AC Drives Power Electronics Power Systems Basics Vehicle Cinematics & Dynamics Digital Control and microcontrollers Electrical machines Dynamic control of AC machines	Power Systems for Aerospace, Marine and Automotive Application Advanced power Conversion Advanced AC Drives + Project Advanced AC Machines Technologies for the Hydrogen Economy	Design of hybrid (HEV) and electric vehicles (EV) (includes Vehicle Cinematics & Dynamics) Energy storing and recovering in power systems and hybrid/electric vehicles EMC Power Systems for electrical transportation Applied simulation to electrical Transportation Electrical Transportation	Master's Thesis Internship

- The course allows the exchange of knowledge and professional experiences in a multicultural and multilingual context.
- Students will have the opportunity to attend local language and local culture courses so as to facilitate their integration in diverse backgrounds.
- Both specializations of the Master allow the student to work in two of the most promising sectors in terms of social return, job creation and relevance to the recovery of the global economy.

EMMC STEPS tuition fees:

- Tuition fees for Third-country graduate student (Category A students): €4,000 per semester, €16,000 for the full academic programme
- Tuition fees for European graduate students (Category B students): €2,000 per semester, €8,000 for the full academic programme

The number of scholarships for each category of individuals will be defined on a yearly basis by the Education, Audiovisual and Culture Executive Agency (EACEA):

• The amount of the full-study scholarship will be higher for third-country masters students (Category A scholarships) than for European masters students* (Category B scholarships). Category A scholarships are conceived as "full scholarships" covering all necessary costs of the student during his/her study period in Europe. Category B scholarships have to be considered as a "financial contribution" to the student's costs while following his/her EMMC studies.



Academic year 2012/2013



Academic year 2013/2014

http://www.emmcsteps.eu



Visa; monthly allowances Title recognition Technical colleges







Academic year 2014/2015



Academic year 2012/2013



1st Graduates Internships

Student	MsThesis	Internships	Internships Institution	Country	Ms Thesis Institution
Chibuike Maduko	9	8	Vattenfall Vindkraft ABB	Sweden	University of Oviedo
Dereje Lemma					
Woldegiorgis	9	7.5	The University of Nottingham	UK	The University of Nottingham
Edgar Nuño	9	9.5	EDP Renováveis	Brazil	Instituto Politécnico de Coimbra (ISEC)
Enrique Rodríguez Díaz	10	10	University of Oviedo	Spain	University of Oviedo
			University of Wisconsin-		
Huthaifa M. Flieh	10	10	Madison	USA	University of Wisconsin-Madison
Minoru Ithamar Tsuru					
Rodríguez	8.5	8.5	NCKU Taiwan	Taiwan	NCKU Taiwan
Octavian Mihai Rotariu	9	9	CT SEAT	Spain	University of Oviedo
Md. Rejwanur Rashid					
Mojumdar	10	7	EDP Renováveis, The UK	UK	University of Oviedo
Shan Huang	Pending	Pending	EDP Renováveis	Spain	University of Oviedo
Shreenidhi Sharma	8.9	8.88	The University of Nottingham	UK	The University of Nottingham
Therese					
Uzochukwuamaka Okeke	8.5	8.6	EDP Renováveis, The UK	UK	University of Oviedo
Konstantinos Valasiadis	Pending	Pending	Univ. Federal Santa Maria	Brazil	Univ. Federal Santa Maria
Chanditha Udalagama	10	10	Alstom Grid UK Limited	UK	The University of Nottingham

Graduates distribution for the first two editions

(employment/PhD)

EMMC STEPS ALUMNI

Cohort 2012-	2014
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Given Name	Family Name	Graduation date	Status	Time to first job	Actual occupation	Phd	Intern
Chanditha	Udalagama	September 2014	Working	Working at Alstom just after finishing Master Thesis	Control Design Engineer at Alstom Grid	No	The University of Nottingham
Chibuike	maduko	September 2014	Working	Working at ABB just after finishing Master Thesis	Power Engineer ABB	No	Vattenfall
Dereje	lemma	September 2014	PhD	PhD in Nottingham just after finishing Master Thesis	Graduated Student Researcher. The University of Nottingham	Yes	The University of Nottingham
Edgar	Nuño	September 2014	PhD	6 months to get admission at PhD programme	PhD student, DTU Wind Energy (Denmark)	Yes	EDP, Brasil
Enrique	Rodríguez	September 2014	PhD	6 months to get admission at PhD programme	PhD student, A alborg Univesity	Yes	University of Oviedo
Shan	huang	September 2015	Working	She started working at State Grid in 2014, before finishing Master Thesis	State Grid Corporation of China	No	EDP
Huthaifa	Flieh	September 2014	PhD	PhD at the University of Wisconsin-Madison just after finishing Master Thesis	Phd student, The University of Wisconsin-Madison (WEMPEC)	Yes	University of Wisconsin-Madison
Konstantinos	Valasiadis	September 2015		NOT KNOWN	NOT KNOW N	No	Univerisity of Santa Maria (Brasil)
Md.	M ojumdar	September 2014	Working	6 months	Senior Lecturer at Primeasia University (Bangladesh)	Yes	EDP UK,, Scotland
Minoru	Tsuru	September 2014	Working	6 months	Tesla Motors (Nederland)	No	NCKU-Boyam (Taiwan)
Octavian	Rotariu	September 2014	Working	1 month	Electromechanical Engineer. Entropea Labs Ltd.	Yes	SEAT
Sagar	Pokhrel	September 2015		NOT KNOWN	NOT KNOW N	No	University of Wisconsin-Madison
Shreenidhi	Sharma	September 2014	Working	He started working in NTPC two months before finishing the master thesis	Deputy Manager Engineer Office in NTPC Ltd	No	The University of Nottingham
Therese	Okeke	September 2014	Working	She got the position at Siemmens one month after she graduated	Graduated Engineer. Siemmens Rail Automation UK	No	EDP UK, Scotland
				Cohort 2013-20	15		
Given Name	Family Name	Graduation date		Time to first job	Actual occupation	Phd	Intern
Getnet	Tadesse	September 2015	Unemploy ed	Still not working	Applying to Lecturer and researcher positions in Ethiopia	Yes	University of Nottingham
Patrick	Silungwe	September 2015	Working	Just after finishing master thesis	Principal Energy Officer Department of Energy Affairs (Malawi)		University of Nottingham
Ahmed	Saleque	September 2015	Working	1 week	American International University-Bangladesh (AIUB) as a Lecturer		University of Wisconsin-Madison
Mebrahtom	Beraki	September 2015	PhD	3 months	Phd student, Université de Sherbrooke, (Canada)	Yes	Polytechnic Institute Coimbra
S.M.	Ferdous	September 2015	PhD	Just after finishing master thesis	Phd student, University of Oviedo	Yes	University of Oviedo
Damir	Brackovic	September 2015	Unemploy ed	Still not working	Still not working		University of Rome
Umer	Mushtaq	September 2015	Working	1 month	ISASTUR, (Spain)		University of Oviedo
Petros	Tsegay	September 2015		NOT KNOWN	NOT KNOW N	NOT KNOW N	University of Oviedo
Mert	Karadeniz	September 2015	PhD	Just after finishing master thesis	Phd student, Politecnico di Torino	Yes	University of Rome
Rahul	Kohli	September 2015	Working	Just after finishing master thesis	Gamesa	No	Gamesa
David	Novak	September 2015	Working	Just after finishing master thesis	Gamesa	No	Gamesa
Arnis	Rubins	September 2015	Working	Just after finishing master thesis	Blue Shock Taxi (Latvia)	No	Blue Shock Taxi
Mariia	Plakhova	September 2015	Unemploy ed	Still not working	Still not working	No	University of Oviedo
Alexander	Limas	September 2015	Unemploy ed	Still not working	Still not working		University of Gent
Phunjasit	Chokesomritpol	September 2015		NOT KNOWN	NOT KNOW N		University of Nottingham
							Mercedes Benz Research and
Devrai	Dutt	September 2015	Working	Just after finishing master thesis	Phd student, University of Oviedo	Yes	Development North America, Inc.
Sobhi	Baro	September 2015	Working	3 months	ISASTUR (Spain)	No	University of Wisconsin-Madison
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 Erasmus Mundus Joint Master Degree in Sustainable Transportation and Electrical Power Systems it was certified for more 6 years.

 In 10 of April of 2028, the Management Board decides to accredit the study programme, in accordance with the External Assessment Team recommendation and reasons





• Thank you for your atention!!



Universidad de Oviedo



Erasmus Mundus Joint Master Course

Sustainable Transportation and Electrical Power Systems http://www.emmcsteps.eu

