[GAOO04] ELECTRIC POWER CONVERSION

GENERAL INFORMATION

Studies	DEGREE IN ENERGY ENGINEERING	**Subject**	ELECTRICAL POWER
Semester	1 **Course** 3	**Mention / Field of specialisation**	
Character	COMPULSORY		
Plan	2013	**Language**	ENGLISH
Credits	6 **Hours/week** 3.72	**Total hours**	67 class hours + 83 non-class hours = **150 total hours**

FACULTY

AIZPURU LARRAÑAGA, IOSU

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
ELECTRONIC TECHNOLOGY I ELECTRONIC TECHNOLOGY II	*(No previous knowledge required)*

SKILLS

SKILLS	ECTS
G1A313 - To be able to work in multidisciplinary, multilingual environments, and to effectively communicate knowledge, procedures, results and ideas about energy both verbally and in writing.	0,48
G1A306 - Applied knowledge of power electronics.	5,52
Total:	6

LEARNING RESULTS

RGA316 **[!]** ***Analiza y dimensiona convertidores no controlados (AC-DC)***

LEARNING ACTIVITIES	CH	NCH	TH
Classroom presentations of relevant concepts and procedures in participatory environments.	12 h.		12 h.
Individual study and work, tests and evaluations.	3 h.	5 h.	8 h.
Individual and/or team computer simulation practice.	3 h.	2 h.	5 h.
Individual and group exercises.	3 h.	2 h.	5 h.

EVALUATION SYSTEM	W
Individual written and oral tests to assess technical skills in the subject.	90%
undefined	10%

Comments:

MAKE-UP MECHANISMS
Written exam
Comments: 25% first exam 75% retake exam

CH - Class hours: 21 h.
NCH - Non-class hours: 9 h.
TH - Total hours: 30 h.

RGA317 **[!]** ***Analiza y dimensiona convertidores controlados (DC-DC y DC-AC)***

LEARNING ACTIVITIES	CH	NCH	TH
Classroom presentations of relevant concepts and procedures in participatory environments.	32 h.		32 h.
Individual study and work, tests and evaluations.	2 h.	6 h.	8 h.
Individual and/or team computer simulation practice.	4 h.	4 h.	8 h.
Individual and group exercises.	4 h.	4 h.	8 h.
Workshop and/or lab practice.	4 h.		4 h.

EVALUATION SYSTEM	W
Individual written and oral tests to assess technical skills in the subject.	90%
undefined	10%

Comments:

MAKE-UP MECHANISMS
Written exam
Comments: 25 % first exam 75 % retake exam

CH - Class hours: 46 h.
NCH - Non-class hours: 14 h.
TH - Total hours: 60 h.

RGA318 **[!]** ***Aplica conocimientos de electrónica de potencia en un entorno real o simulado***

LEARNING ACTIVITIES	CH	NCH	TH
Development, writing and presentation of group projects and/or POPBL.		48 h.	48 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Project assessment. The following will be taken into account: (a) Throughout the project, continuous assessment of both the individual student and the team, regarding task performance; (b) On completion of the project, the solution provided by the team of students and the corresponding report; (c) Lastly, the oral defence of the project, taking into account both the knowledge acquired and the quality of the presentation, the reasoned justification of the principals and the ultimate reasons for proposing the chosen solution. **Comments:**	100%	[!] *Evaluación continua* **Comments:**

CH - Class hours: 0 h.
NCH - Non-class hours: 48 h.
TH - Total hours: 48 h.

RGA337 **[!]** ***Define los objetivos, realiza la planificación para su consecución y su seguimiento sistemático coordinando su trabajo con los demás miembros del equipo.***

LEARNING ACTIVITIES	CH	NCH	TH
Development, writing and presentation of group projects and/or POPBL.		3 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Project assessment. The following will be taken into account: (a) Throughout the project, continuous assessment of both the individual student and the team, regarding task performance; (b) On completion of the project, the solution provided by the team of students and the corresponding report; (c) Lastly, the oral defence of the project, taking into account both the knowledge acquired and the quality of the presentation, the reasoned justification of the principals and the ultimate reasons for proposing the chosen solution. **Comments:**	100%	[!] *Evaluación continua* **Comments:**

CH - Class hours: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

RGA338 **[!]** ***Argumenta la selección de las teorias, métodos y/o tecnologías más relevantes que permitan definir y/o solucionar un problema utilizando bibliografía de calidad***

LEARNING ACTIVITIES	CH	NCH	TH
Development, writing and presentation of group projects and/or POPBL.		3 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Project assessment. The following will be taken into account: (a) Throughout the project, continuous assessment of both the individual student and the team, regarding task performance; (b) On completion of the project, the solution provided by the team of students and the corresponding report; (c) Lastly, the oral defence of the project, taking into account both the knowledge acquired and the quality of the presentation, the reasoned justification of the principals and the ultimate reasons for proposing the chosen solution. **Comments:**	100%	[!] *Evaluación continua* **Comments:**

CH - Class hours: 0 h.
NCH - Non-class hours: 3 h.

TH - Total hours: 3 h.

RGA339 **[!]** ***Redacta informes técnicos de forma clara, concisa y estructurada siguiendo las especificaciones establecidas haciendo énfasis en la coherencias entre los distintos apartados .***

LEARNING ACTIVITIES	CH	NCH	TH
Development, writing and presentation of group projects and/or POPBL.		3 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Project assessment. The following will be taken into account: (a) Throughout the project, continuous assessment of both the individual student and the team, regarding task performance; (b) On completion of the project, the solution provided by the team of students and the corresponding report; (c) Lastly, the oral defence of the project, taking into account both the knowledge acquired and the quality of the presentation, the reasoned justification of the principals and the ultimate reasons for proposing the chosen solution. **Comments:**	100%	[!] *Evaluación continua* **Comments:**

CH - Class hours: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

RGA340 **[!]** ***Presenta y defiende el trabajo en público de forma clara, concisa y estructurada mediante el uso apropiado de soporte visual según las especificaciones establecidas.***

LEARNING ACTIVITIES	CH	NCH	TH
Development, writing and presentation of group projects and/or POPBL.		3 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Project assessment. The following will be taken into account: (a) Throughout the project, continuous assessment of both the individual student and the team, regarding task performance; (b) On completion of the project, the solution provided by the team of students and the corresponding report; (c) Lastly, the oral defence of the project, taking into account both the knowledge acquired and the quality of the presentation, the reasoned justification of the principals and the ultimate reasons for proposing the chosen solution. **Comments:**	100%	[!] *Evaluación continua* **Comments:**

CH - Class hours: 0 h.
NCH - Non-class hours: 3 h.
TH - Total hours: 3 h.

CONTENTS

0. Introduction

1. Power analysis.

•DC and steady state.

•One phase and 3 phase.

oSinusoidal and Non sinusoidal.

2. AC/DC converters

•Non controlled converters.

oOne phase and 3 phase.

3. DC/DC converters

•Non Isolated.

•Isolated.

4. DC/AC converters

•One phase and 3 phase.

oModulation techniques.(Square wave, PWM…)

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Moodle Platform	Power Electronics (Daniel W. Hart)
Lab practical training	Fundamentals of Power electronics (Erickson, Robert W., Maksimovic, Dragan)
Slides of the subject	Power Electronics: Converters, Applications, and Design, 3rd Edition (Ned Mohan, Tore M. Undeland, William P. Robbins).
	Power Electronics: Devices, Drivers, Applications, and Passive Components (Prof Barry Wayne Williams).