

## Course guide

### 220254 - 220254 - Advanced Instrumentation

Last modified: 19/04/2023

**Unit in charge:** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
**Teaching unit:** 710 - EEL - Department of Electronic Engineering.

**Degree:** MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).

**Academic year:** 2023    **ECTS Credits:** 2.5    **Languages:** Spanish

#### LECTURER

**Coordinating lecturer:** JAVIER GAGO BARRIO

**Others:**

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

##### Specific:

1. Capability for modeling, analysis, calculation and design of electrical power systems.
2. Ability to calculate and design electrical machines and actuators, with knowledge of efficient electrical systems and efficient control of electrical drives.
3. Ability to project conventional and non-conventionals power facilities.
4. Knowledge to data integration and industrial communications.
5. Knowledge to the management and monitoring of automated information processes energy.
6. Ability to model and solve problems associated with the operation of electric power systems by integrating information technologies and communication: protection, network operation, and electricity market stability.

#### TEACHING METHODOLOGY

#### LEARNING OBJECTIVES OF THE SUBJECT

Design, analysis , installation and commissioning of equipment and advanced instrumentation systems

#### STUDY LOAD

Type	Hours	Percentage
Hours small group	7,5	12.00
Self study	40,0	64.00
Hours large group	15,0	24.00

**Total learning time:** 62.5 h



## CONTENTS

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### Automatic power measurement

**Description:**

- 1- Design of a conditioner for measuring electrical power
- 2- Adquisició with ARDUINO
- 3- Wireless data transmission
- 4- LABVIEW acquisition and processing program
- 5- PLC communication

**Full-or-part-time:** 62h 30m

Theory classes: 15h

Laboratory classes: 7h 30m

Self study : 40h

## GRADING SYSTEM

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Exam 25%

Laboratory 50%

Project 25%

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

## BIBLIOGRAPHY

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**Basic:**

- Pérez García, M.A. [et al.]. Instrumentación electrónica. 2ª ed. Madrid: Thomson, 2004. ISBN 8497321669.

**Complementary:**

- Tomasi, Wayne. Sistemas de comunicaciones electrónicas [on line]. 4ª ed. México: Pearson Educación, 2003 [Consultation: 03/10/2022]. Available on : [https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB\\_BooksVis?cod\\_primaria=1000187&codigo\\_libro=3801](https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=3801). ISBN 9702603161.

## RESOURCES

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**Hyperlink:**

- <http://www.ni.com/labview/esa/>