COURSE DATA

DATA SUBJECT

Code: 44285
Name: Industrial instrumentation systems
Cycle: Master's Degree
ECTS Credits: 1.5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2199 - Master's Degree in Electronic Engineering	Escola Tècnica Superior d'Enginyeria	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2199 - Master's Degree in Electronic Engineering	Industrial electronic	COMPULSORY

COORDINATION

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GIRBES JUAN VICENT

SUMMARY

In this course are presented techniques and criteria for design, control and test instrumentation systems and virtual instruments. It is taught as a compulsory subject in the Master of Electronic Engineering from the University of Valencia, during the first quarter.

The total workload is 1.5 ECTS. They correspond to 15 on-site hours and 22.5 hours of student individual work.

The purpose of this course is to introduce students to put into practice the techniques and methods for design and develop the control and monitoring of several instrumentation systems. Emphasis will be placed on solving real problems.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

The background needed to properly follow the subject is taught in the subjects dealing with electronic equipment and design. Specifically in the laboratories where the data acquisitions and measurement instruments are used.

COMPETENCES / LEARNING OUTCOMES

2199 - Master's Degree in Electronic Engineering

Capacidad para dirigir, planificar y supervisar equipos multidisciplinares.

Capacidad para proyectar, calcular y diseñar productos, procesos e instalaciones en todos los ámbitos de la Ingeniería Electrónica y en particular los de tratamiento de la señal, sistemas digitales y de comunicaciones y electrónica industrial.

Demostrar una comprensión sistemática de un campo de estudio y el dominio de las habilidades.

Diseñar un sistema, componente o proceso que cumpla unas especificaciones desde diferentes puntos de vista: electrónico, económico, social, ético y medioambiental.

Identificar, formular y resolver problemas de los sistemas electrónicos industriales.

Realizar un análisis crítico, evaluación y síntesis de ideas nuevas y complejas.

Ser capaz de fomentar, en contextos académicos y profesionales, el avance tecnológico, social o cultural dentro de una sociedad basada en el conocimiento.

Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.

Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.

Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.

Students should demonstrate self-directed learning skills for continued academic growth.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

Take into account the economic and social context in engineering solutions, be aware of diversity and multiculturalism and ensure sustainability and respect for human rights and equality between men and women.

DESCRIPTION OF CONTENTS

1. Distributed measurement system

Virtual Instrumentation: goals and applications.
Instrumentation systems: goals and applications.
Architecture: hardware and software.
Distributed measurement systems: goals and applications.

2. Communication buses

Serial: RS232-USB. Standard, configuration and application.
GPIB. Standard, configuration and application.
PXI. Standard, configuration and application.

3. Laboratory

Practice 1.- Virtual instrument: Generation of a system with GPIB communication. Error detection and debugging techniques.
Practice 2.- Compact DAQ. Configuration and design of an instrumentation system.
Practice 3.- MYRIO: FPGA over LV

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	10,00
Laboratory	5,00
Total hours	**15,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	2,00
Independent study and work	7,50
Preparation of lessons	5,00
Preparation for assessment activities	5,00
Resolution of case studies	3,00
Total hours	**22,50**

TEACHING METHODOLOGY

The teaching methods employed in the development of the course are:

a) Theoretical activities.

Expository development of matter with the student's participation in the resolution of specific issues.

b) Practical activities.

Solving practical problems

c) Student's personal work.

Description: Performing outside the classroom to issues and software as well as the preparation of classes and exams (study). This task will be performed individually and try to promote self-employment.

We will use e-learning platforms (LMS) to support communication with students. Through it the student will have access to course materials used in class, as well as solving problems and exercises.

EVALUATION

The evaluation of the subject will consist of a written test, with theoretical and practical questions, and laboratory.

REFERENCES

- LabVIEW Advance Programming Techniques, Rick Bitter, Taqi Mohiuddin, Matt Nawrocki. CRC Press. ISBN0-8493-2049-6.
- Instrumentació virtual, Adquisició, processament i anàlisi de senyals. A. M. Làzaro, D. Biel Solé, J. Olivé Duran, J. Prat Tasias, F. J. Sànchez Robert. Edicions UPC.
- LabVIEW programming, data acquisition and analysis. Jeffrey Y. Beyon. Ed. Prentice Hall PTR.
- LabVIEW for automatitations, semiconductor, biomedical, and other applications. Hall T. Martin, Meg L. Martin. Ed. Prentice Hall PTR.
- LabVIEW graphical programming,. Practical Applications in Instrumentation and Control. Gary W. Johnson. Ed. Mc Graw Hill, 2ª Edición.