

[GEJ303] ELECTRONIC INSTRUMENTATION

GENERAL INFORMATION

Studies	DEGREE IN INDUSTRIAL ELECTRONICS ENGINEERING		Subject	?	
Semester	1	Course	3	Mention / Field of specialisation	
Character	COMPULSORY				
Plan	2022	Modality	Face-to-face	Language	CASTELLANO/EUSKARA
Credits	4,5	Hours/week	3.83	Total hours	69 class hours + 43.5 non-class hours = 112.5 total hours

PROFESSORS

ARANGUREN DERIOZPIDE, JON

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
MATHEMATICS III	(No previous knowledge required)
ELECTRONIC TECHNOLOGY	
BASICS OF ANALOGUE ELECTRONICS	

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
GER303 - To know and apply electronic instrumentation		x		3,78
G-RTR1 - To develop interdisciplinary projects specific to their specialty and of gradual complexity, - becoming aware of respect for human rights and fundamental rights, and analyzing and assessing the impact of the proposed solutions on the SDGs - to acquire and/or apply basic, advanced and /or avant-garde, demonstrating the ability to work in multidisciplinary teams and/or undertake further studies with a high degree of autonomy		x		0,4
G-RTR2 - To express information, ideas and the arguments that support them in an orderly, clear and coherent manner, orally and in writing, based on quality information, self-made or obtained from different sources, using inclusive and non-discriminatory language		x		0,32
Total:				4,5

KC: Knowledge or Content / SK: Skills / AB: Abilities

ENAE LEARNING RESULTS

- ENA102** - Knowledge and comprehension: Knowledge and comprehension of the engineering disciplines of their speciality, at the level necessary to acquire the rest of the competencies of the degree, including notions of the latest advances.
- ENA104** - Analysis in engineering: The ability to analyse complex products, processes and systems in their field of study; choose and apply relevant analytical, calculation and experimental methods in a suitable way; and correctly interpret the results of such analyses.
- ENA105** - Analysis in engineering: The ability to identify, formulate and solve engineering problems in their speciality; choose and apply adequately established analytical, calculation and experimental methods; and acknowledge the importance of social, health and safety, environmental, economic, and industrial restrictions.
- ENA106** - Engineering projects: Ability to project, design and develop complex products (parts, components, finished products, etc.), processes and systems of their speciality, which meet the established requirements, including awareness of the social, health and safety, environmental, economic and industrial aspects, as well as selecting and applying appropriate project methods.
- ENA109** - Research and innovation: Ability to consult and apply codes of good practice and security in their speciality.
- ENA110** - Research and innovation: Capacity and ability to project and carry out experimental investigations, interpret results, and reach conclusions in their field of study.
- ENA111** - Practical application of engineering: Understanding of the applicable techniques and methods for analysis, design and research and their limitations in the field of their speciality.
- ENA112** - Practical application of engineering: Practical competency to solve complex problems, carry out complex engineering projects, and conduct investigations specific to their speciality.
- ENA113** - Practical application of engineering: Knowledge of application of materials, equipment and tools, engineering technology and processes, and their limitations in the field of their speciality.
- ENA117** - Preparation of judgements: Ability to collect and interpret data and handle complex concepts within their speciality, in order to make judgements that involve reflection on ethical and social issues.
- ENA118** - Preparation of judgements: Ability to manage complex technical or professional activities or projects of their speciality, taking responsibility for decision making.
- ENA119** - Communication and Teamwork: Ability to effectively communicate information, ideas, problems and solutions in the field of engineering and with society in general.
- ENA120** - Communication and Teamwork: Ability to operate effectively in domestic and international contexts, individually and as a team, and to cooperate with both engineers and people from other disciplines.

CONTENTS

- Sensor fundamentals

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- 1.1 Introduction to sensor based measurement systems.
 - 1.2 Temperature measurement
 - 1.3 Strain, force or pressure measurement (Bridge based system)
 - 1.4 Position/Velocity measurement with encoders (counter input)
 - 1.5 Electrical current measurement
 - 2. Signal conditioning circuits
 - 2.1 Filters
 - 2.2 Operational amplifiers
 - 2.3 Instrumentation amplifiers
 - 2.4 Isolation amplifiers
 - 2.5 Digital to Analog (D/A) and Analog to Digital (A/D) converters

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources	Bibliography
Subject notes	Lázaro, Antonio Manuel. PROBLEMAS resueltos de instrumentación y medidas electrónicas. Paraninfo. Madrid. 1994. ISBN: 84-283-2141-8
Moodle Platform	Pallás Areny, Ramón. Sensores y acondicionadores de señal (4 ed). Marcombo. Barcelona. 2003. ISBN: 84-267-1344-0
Class presentations	