COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

Syllabus
2025 - 2026

GENERAL INFORMATION

Data of the subject	
Subject name	Electrical Measurements
Subject code	DIE-GITI-341
Mainprogram	Bachelor's Degree in Engineering for Industrial Technologies
Involved programs	Grado en Ingeniería en Tecnologías Industriales [Third year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Obligatoria (Grado)
Department	Department of Electrical Engineering
Coordinator	Ignacio Egido
Schedule	Find it at the official website (http://horarios.comillas.edu/ICAIGrado1Sem/Horarios/)
Office hours	Please contact the professor

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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Prerequisites

Electrical circuit analysis

Electromagnetic fields applied to electrical machines

Basic measurement equipment

Basic electrical circuit connection and operation

Course contents

Contents

1. Voltage and current regulation
2. Measurement accuracy
3. Measurement of resistance. Basic methods, small resistance, isolation resistance, grounding resistance
4. Oscilloscope
5. Measurement of power and energy
6. Measurement of capacitance and reactance
7. Calibration
8. Sampling and time series analysis
9. Measurement of ferromagnetic materials characteristics in AC

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Mid-term exam + final exam	Theory understanding and application to solving exercises. Analysis of the results	45
Short questions in class	Theory understanding and application to solving exercises	5
Lab sessions	Work in groups. Circuit connection and measuring process. Analysis of measurements and results	50

Grading

Regular assessment:

- Assessment from class lectures accounts for 50%: first exam (30%), second exam (60%) and short questions in class (10%).
- Lab session accounts for 50%: session preparation, 30%, session report, 30%, final exam, 40%.
- A grade of five is compulsory in both the grade obtained from class content derived from lectures as well as the lab grade in order to pass the subject.

Retakes:

The student has two periods of final evaluation during one academic year. The first one will be carried out at the end of the course (end of the semester). If the subject is not passed, obtaining five or more points, the student has another opportunity for final evaluation at the end of the academic year. The dates of evaluation periods will be announced on the web page. The new grade will be obtained as follows:

- Assessment from class lectures accounts for 50%: retake exam (90%) and short questions in class (10%).
- Lab session accounts for 50%: session preparation, 30%, session report, 30%, retake exam, 40%.
- A grade of five is compulsory in both the grade obtained from class content derived from lectures as well as the lab grade in order to pass the subject.

Course rules :

- Class attendance is mandatory according to Article 93 of the General Regulations (Reglamento General) of Comillas Pontifical University and Article 6 of the Academic Rules (Normas Académicas) of the ICAI School of Engineering. Not complying with this requirement may have the following consequences: students who fail to attend more than 15% of the lectures may be denied the right to do the final exam (and even the retake exam)
- Students who fail to attend three or more lab sessions (out of 9) will be denied the right to take both the final exam and the retake

exam.

- Students who commit an irregularity in any graded activity will receive a zero mark in the activity, and the disciplinary procedure will follow (cf. Article 168 of the General Regulations (Reglamento General) of Comillas Pontifical University).
- AI may be used for pre-tak activities such as brainstorming, outlining and initial research. This level focuses on the effective use of AI for planning, synthesis, and ideation, but assessment should emphasise the ability to develop and refine these ideas independently.

WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Lab session 1	Week 3	Week 4
Lab session 2	Week 4	Week 5
Lab session 3	Week 5	Week 6
Lab session 4	Week 7	Week 8
Lab session 5	Week 10	Week 11
Lab session 6	Week 11	Week 12
Lab session 7	Week 12	Weel 13
Lab session 8	Week 13	Week 13
Lab session 9	Week 14	Week 14
Final exam	Week 15	

BIBLIOGRAPHY AND RESOURCES

Basic References

- Chacón, Francisco J., Medidas eléctricas para ingenieros, Colección ingeniería, Universidad Pontificia Comillas, 2007. (in Spanish)
- Webster, John G., Electrical Measurement, Signal Processing and Displays, CRC press, 2004.
- Tumanski, S., Principles of electrical measurement, Taylor & Francis, 2006.