Curricular Unit Sheet

1. Curricular Unit Syllabus.

1.1. Curricular Unit

Campo alfanumérico (1.000 carateres).

1.2. Scientific area acronym

EE

1.3. Duration

Semester

1.4. Total of Working Hours

148.5 h

1.5. Contact hours

45.0 h (T: 22.5 h; P: 22.5 h)

1.6. ECTS

6.0

1.7. Observations

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2. Responsible Academic staff and lecturing load in the curricular unit (enter full name)

Vasco Emanuel Anjos Soares (1.º/2.º S, 2018-2019)	- / 3.0 h

3. Other academic staff and lecturing load in the curricular unit

Nelson Filipe Pereira dos Santos (1.º/2.º S, 2018-2019)	- / 3.0 h

4. Learning outcomes of the curricular unit

The aim is to enable the student to develop skills on the analysis and implementation of signal acquisition and data transmission systems for measurement, processing and control purposes.

5. Syllabus

Theoretical program:

Chapter 1 – Signal/Data Acquisition Systems Overview. Chapter 2 – Noise Signal Sources and Noisy Environments. Chapter 3 – Analogue and Digital Signal Conditioning. Chapter 4 – Amplifiers. Chapter 5 – Unipolar and Bipolar Analogue Multiplexers. Chapter 6 – Continuous and Discrete Signals. Chapter 7 – Sampling-and-Hold. Chapter 8 – Digital-to-Analog and Analog-to-Digital Converters. Chapter 9 – Systems, Converters and Controllers Modeling. Chapter 10 – Signal Acquisition System Organization. Chapter 11 – Signal/Data Acquisition with Microcomputers. External and Internal Interfaces.

Programa Prático:

TP0 – Introduction to Signal Acquisition Systems – Analog and Digital Signal Acquisition and Generation
TP1 – Conditioning System and Acquisition on LabVIEW for a Resistance Temperature Detector
TP2 - Conditioning System and Acquisition on LabVIEW for a Load Cell
TP3 - Conditioning System and Acquisition on LabVIEW for Mains Voltage and Current Measurement and Harmonic Analysis.

6. Demonstration of the syllabus coherence with the curricular unit's objectives

The theoretical program with respect to organization, fundamental concepts and analysis enables to achieve the necessary skills for the implementation of acquisition systems on Instrumentation area.

7. Teaching methodologies (including evaluation)

1. In the theoretical classes (T) the contents of the UC are taught. Under theoretical-practical (TP) classes, practical case problems are presented and solved, aligned with the contents taught in the theoretical component. In laboratory classes (PL), the knowledge acquired is applied carrying out laboratory teamwork.
2. The unit final grade, FG, is the arithmetical mean of the grades obtained in the summative theoretical evaluation, T, and summative practical evaluation, P: $FG = (T+P)/2 \geq 10$
3. The theoretical grade, T, is obtained in the final test or in one of the final exams (normal or complementary period). This grade must be equal or greater than 10 (ten), in a 20-point grading scale, in order to obtain approval at the curricular unit.
4. The practical grade, P, is the weighted mean of the grade assigned to the practical reports, R, and the formative evaluation, I, assigned by the laboratory class teacher: $P = (2\,R+I)/3 \geq 10$
5. The grade assigned to the practical reports, R, is established from the student's reports analysis complemented with the reports discussion by a two teacher's jury. It's necessary to deliver at least two thirds of practical experiments reports accomplished during the semester. The grade assigned to the practical reports, R, is weighted by the ratio between the number of delivered reports and the number of practical reports.

8. Demonstration of the coherence between the teaching methodologies and the learning outcomes

The teaching methodologies promote the development of theoretical and practical skills aiming the implementation of acquisition systems on Instrumentation area.

9. Bibliography

Aquisição e Processamento de Sinais; Vasco Soares; ADEEEA, ISEL; February 2018