Curricular Unit Sheet

1. Curricular Unit Syllabus.

1.1. Curricular Unit

Discrete Signal Processing

1.2. Scientific area acronym

EE

1.3. Duration

One semester

1.4. Total of Working Hours

162

1.5. Contact hours

T: 22,5; TP: 22,5; PL: 22,5

1.6. ECTS

6

1.7. Observations

Option 1

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

Fernando Manuel Fernandes Melício	22,5 h

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

Fernando Joaquim Ganhão Pereira	45h

4. Learning outcomes of the curricular unit

After concluding with success this unit, students should be able to deal with the following: - To understand the main concepts and the fundamental tools in discrete signal processing. - To understand and analyse a representation of discrete signal in frequency. - To design digital filters.

5. Syllabus

- Introduction to discrete time signals and systems
- z Transform
- Discret Fourier Transform
- Structures for Discrete Systems

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

The content of this unit starts with an introduction to the notion of a discrete signal. It follows the relationship between an analogue and a discrete signal through the Nyquist Theorem. z Transform is studied next and after that it is introduced the definition of Discrete Fourier Transform. Due to its importance, it is studied with some detail the Fast Fourier Transform algorithm. Digital filter techniques are also addressed with some examples.

7. Teaching methodologies (including evaluation)

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.

The theoretical part is introduced during the semester and there is an individual evaluation by a written exam. There is also a laboratory component which a student must accomplish with success.

The laboratorial work consists in a series of practical exercises in Matlab.

The final mark is obtained by the following formula: F = 0.7 * T + 0.3 * L. It is mandatory that the value for each part will be no less than 9.5 in a scale 0 – 20.

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

The theoretical component is mainly dedicated to the development of skills in the theoretical concepts that are key points in the analysis and processing of discrete signals.

The laboratory part is used mainly to develop skills in solving real practical exercises.

9. Bibliography

- Oppenheim, Alan V., and Ronald W. Schafer. Digital Signal Processing. Prentice Hall, 1999.
- Oppenheim, Alan V., and A. S. Willsky. Signals and Systems. Prentice Hall, 2014