Universidad Zaragoza

Academic Year/course: 2021/22

30379 - Digital Signal Processing Applications

Syllabus Information

Academic Year: 2021/22
Subject: 30379 - Digital Signal Processing Applications
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 581 - Bachelor's Degree in Telecomunications Technology and Services Engineering
ECTS: 6.0
Year: 4
Semester: First semester
Subject Type: Optional
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

In order for students to achieve the learning outcomes described above and acquire the skills designed for this course, the following teaching-learning methodologies are proposed:

? [M1] Participatory master class
? [M4] Problem-based learning
? [M8] Classroom practice
? [M9] Laboratory practice
? [M10] Tutoring
? [M11] Evaluation of student progress
? [M13] Supervised practical work

4.2. Learning tasks

The program offered to the student to help him achieve the expected results comprises the following activities ...

A1. Participatory master classes (26 hours). Presentation by the teacher of the main contents of the course, combined with the active participation of the students. This methodology, supported by the individual study of the student, must provide the student with the theoretical foundations necessary to achieve the indicated learning outcomes and competencies.

A2. Resolution of problems and cases (8 hours). In them, problems and practical cases proposed by the teacher will be solved, based on the fundamentals presented in the lectures, with the possibility that students expose their solutions. This activity will be carried out presentially in the classroom.

A3. Laboratory practice (24 hours). This activity will preferably be carried out presentially in a computer room. It will have 12 sessions of 2 hours each (each topic may take place during 1, 2 or 3 sessions). Before the first session of each topic, students will carry out and deliver a preliminary study with which they will become familiar with the concepts that will be treated in practice. After carrying out the practice, the students will have to answer an evaluation questionnaire.

A4: Supervised practical work. In this activity, students will be proposed to solve a practical assignment related to the

contents covered in the subject. The students will work in a group in the application of the necessary knowledge to successfully solve the practical cases raised. After completing the practical work, each group of students will deliver a document that collects the results obtained and will make a public presentation and defense of their work. The teacher will periodically supervise the progress of the status of the work and solve the doubts raised by each group of students.

A5: Tutoring. Scheduled time for personalized attention to the student in order to review and discuss the materials and topics presented in both theoretical and practical classes.

A6: Time for personal work and study. Non-presential time of work and study.

A7. Evaluation. Set of theoretical-practical tests and presentation of reports or works used in the evaluation of the student's progress. Details can be found in the section corresponding to evaluation activities.

4.3. Syllabus

In the classroom classes, the following contents will be worked on:

- Modeling of signals and optimal estimation of parameters.
- Optimal event detection methods.
- Signal processing through neural networks.

In the practical sessions the following contents will be worked on, using different types of signals (image, voice, audio, radar, biomedical signals). Note that there may be slight changes from one year to another.

- Comparison and detection of sequences with Dynamic Time Warping.
- LPC voice coding.
- Parameter estimation and detection.
- Optimal linear filtering.
- Neural networks for signal processing.
- Pre-processing of the ECG signal and study of heart rhythm variability.
- Time-frequency processing.

4.4. Course planning and calendar

The course calendar, both for classroom lectures and for laboratory sessions, will be determined by the academic calendar established for the course by the Escuela de Ingeniería y Arquitectura. As a guide, there will be 2.5 hours of classroom activities and two hours of laboratory practice per week. The start and end dates of the theoretical and problem classes, as well as the dates of the laboratory practices and global evaluation exams will be those set by the School. The delivery dates and monitoring of the tutored practical work will be announced well in advance in class and on the subject's website in the Anillo Digital Docente: https://moodle.unizar.es

4.5. Bibliography and recommended resources

Course webpage at Anillo Digital Docente: https://moodle.unizar.es

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30379