Universidad Zaragoza

Academic Year/course: 2022/23

68955 - Wearable technology and mHealth

Syllabus Information

Academic Year: 2022/23
Subject: 68955 - Wearable technology and mHealth
Faculty / School: 326 - Escuela Universitaria Politécnica de Teruel
Degree: 614 - Master's in Innovation and Entrepreneurship in Health and Wellbeing Technologies
ECTS: 3.0
Year: 1
Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

The subject and its expected results respond to the following approaches and objectives:
The objective of the course is to provide training on the different types of wearable and integrated sensors in mobile devices: typical applications, choosing the most appropriate for each case, available transmission technologies and integration and adaptation of mHealth applications. With it, students will be able to carry out their own developments in this field.

These approaches and objectives are aligned with some of the Sustainable Development Goals, SDG, of the 2030 Agenda (https://www.un.org/sustainabledevelopment/es/) and certain specific goals, in such a way that the acquisition of the Learning outcomes of the subject provides training and competence to the student to contribute to a certain extent to their achievement:

? Goal 3: Ensure healthy lives and promote well-being for all at all ages.

Target 3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.

Target 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

? Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Target 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

? Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Target 8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training.

? Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Target 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.

1.2. Context and importance of this course in the degree

The optative subject is within the subject group "Innovation in Devices applied to Health and Well-being. Together with the other subjects of the study area, it will allow the student to develop wearable sensor systems related to Health and Well-being, from planning to prototyping, as well as integrating the data obtained in a more complex system implemented in a mobile device to exploit the information obtained. With the course, students can learn a series of technologies with great future prospects and with great growth in recent years.

1.3. Recommendations to take this course

There are no prerequisites for taking this subject.

2. Learning goals

2.1. Competences

After passing the course, the student will be more competent for...
Basic skills:
BS6: That students have and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
BS7: That students know how to apply the acquired knowledge and their problem-solving capacity in new or little-known environments within broader (or multidisciplinary) contexts related to their area of ??study.
BS8: That students are able to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
BS9: That students know how to communicate their conclusions and the latest knowledge and reasons that support them to specialized and non-specialized audiences in a clear and unambiguous way.
BS10: That students possess the learning skills that allow them to continue studying in a way that will have to be largely self-directed or autonomous.

General competences:
GC1: That students have the knowledge, aptitudes and skills necessary to develop innovative work in the field of Health and Well-being technologies.
GC2: That students know how to write documents or technical reports that describe a novel application in the field of technology for Health and Well-being, as well as know mechanisms to protect or distribute it.
GC3: That students search, manage, understand and critically analyze scientific publications, bibliography and documentation in the field of Health and Well-being Technologies.
GC4: That students start a research career with guarantees in the field of Health and Well-being Technologies.
GC5: That students Lead, manage and develop research projects development in innovation in the field of Technologies for Health and Well-being.

Specific competences:
SC7: That students make decisions considering technical, social and economic responsibilities in the field of Health and Well-being, in an integral and interdisciplinary way.
SC8: That students analyze biomedical data and extract relevant information from them for solving problems in the field of Health and Well-being Technologies.
SC9: That students carry out a technological modeling of a real element or scenario in the field of Health and Well-being Technologies, being able to connect it with models from other disciplines.
SC10: That students carry out, present and defend before a university court an original and innovative project or work that solves a real problem in the field of Health and Well-being Technologies in which the skills acquired in the teaching are synthesized and integrated.

2.2. Learning goals

The students, to pass this subject, must demonstrate the following results:
They learn about the types of wearable sensors, their characteristics and typical Health applications.
They choose the most suitable system and sensors for each application in the field of Health and Well-being.
They learn about wireless transmission standards and technologies and their limitations for wearable sensor applications.
They are capable of developing a wearable sensor prototype with some of the technologies exposed in the course.

2.3. Importance of learning goals

Achieving the learning results of the subject will allow the student to capture the relevant data from the environment and the user himself to develop his application idea. The use of wearable sensors and mobile devices opens up a wide range of solutions adaptable to each use case. The wearable sensors and mHealth market has continued to grow in recent years and there are a large number of entrepreneurs starting their projects with these technologies.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The students must demonstrate that they have achieved the expected learning outcomes through the following assessment activities.

The final qualification for the course in the first call is divided as follows:

1) During the teaching period, a project of the subject is carried out (**70% of the final qualification**).

There will be an interview about the project that will count **30% of the final qualification**.
The project will be divided into several parts. In some of them a grade greater than 5 out of 10 will be required to pass.

2) Final exam of official calls

Students who **have not passed the project** the project or who want to improve their grade, there will be a global written test with theoretical and practical questions, as well as a laboratory practice exam.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that has been designed for this subject is based on the following:

1. The continuous study and work from the first day of class.
2. The learning and application of concepts and methodologies, through the provided material. Students will play an active role in the discussion and resolution of problems and questions.
3. The work developing projects proposed by the teachers, the result of which is reflected in the delivery of the properly documented results, and which will serve for the evaluation in the terms indicated in the corresponding section.

The subject material corresponds to the English-Friendly format.

4.2. Learning tasks

The program offered to the student to help him achieve the expected results includes the following activities:
Through the material of the subject provided, the syllabus of the subject will be developed and problems of application of the concepts and techniques presented in the subject program will be solved.
In teaching assignments, students will apply the acquired skills and will reflect it in a document or presentation addressed to the teachers of the subject.
The virtual tutorials will consist of the realization of tutorials proposed by the teacher in a telematic way to clarify the possible doubts that arise during the study
All activities (except 8 hours of practice and the exam) will take place remotely, using the means provided by the University of Zaragoza for this purpose, and taking advantage of what the University of Zaragoza dictates regarding blended teaching.
The remote work of the students will be facilitated.

4.3. Syllabus

Wearable sensors: Classification of wearable sensors and their properties; Advanced applications with wearable sensors: practical cases.

Wireless communication: Special characteristics of wireless communication. Communication protocols and standards for m-Health and e-Health.

mHealth: mobile devices: integrated sensors and their programming. Monitoring of patients with mobile devices. Tracking applications. Interoperability between mobile devices and other systems. mHealth and the Internet of things.

Prototyping of Health applications: new commercial kits.

4.4. Course planning and calendar

Student work

The dedication of the student to achieve the learning results in this subject is estimated at 75 hours distributed as follows:

16 hours of lecture, practice sessions
10 hours of lab sessions
9 hours of assignments
37,5 hours of effective autonomous work and study
2,5 hours of assessment activities

Course planning and calendar

The teaching organization of the subject is as follows:

Lecture, practice sessions and assignments (16 hours). As previously stated, these classes will not be face-to-face and can be followed using different methods: recorded classes, documentation, videos, etc., available on the virtual platform.

Lab sessions (10 hours): the practices assigned by the teachers will be carried out according to the schedule that the center will communicate in due course.

Presentation of assignments under evaluation:

In the problems and assignments that are proposed, their delivery date will be informed when proposed.

The exam schedule and the due dates will be announced well in advance. The management of communication with the students and the materials made available to them will be carried out through the Moodle platform.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=68955