

Academic Year/course: 2022/23

## 68954 - Methodology for R+D+i and data processing in Health and wellnes

### Syllabus Information

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**Academic Year:** 2022/23

**Subject:** 68954 - Methodology for R+D+i and data processing in Health and wellnes

**Faculty / School:** 326 - Escuela Universitaria Politécnica de Teruel

**Degree:** 614 - Master's in Innovation and Entrepreneurship in Health and Wellbeing Technologies

**ECTS:** 9.0

**Year:** 1

**Semester:** First semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

The objective of the course is to provide the formal tools necessary to carry out a research project. For this, the aim is to train the student in the various stages of the research process: from the definition of a project based on the scientific method and the design of the research, through the search for funding, data analysis and, finally obtaining and protecting research results.

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

It is a compulsory subject that is taught in the first semester.

The course is essential for anyone entering the world of research, development and innovation, particularly in the field of Health and Welfare, because it establishes the foundation for the development of this type of activity.

### 1.3. Recommendations to take this course

In the event that the Internal Quality Assurance Commission of the degree indicates so, it is recommended to be carrying out the training supplements that have been established for the student.

In addition, the study and continued work, from the first day of the course, are essential to pass the subject with the maximum advantage. It is important to resolve any doubts that may arise as soon as possible, for which the student has the advice of the teacher.

## 2. Learning goals

### 2.1. Competences

By passing the course, the student will be more competent to...

#### Basic skills:

CB7: Students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multi-disciplinary) contexts related to their area of study.

CB8: Students are able to integrate knowledge and deal with the complexity of making judgements based on incomplete or limited information, including reflections on social and ethical responsibilities associated with applying their knowledge and judgements.

CB9: Students are able to communicate their findings and the ultimate knowledge and reasons behind them to specialist and non-specialist audiences in a clear and unambiguous manner.

CB10: Students possess the learning skills to enable them to continue studying in a largely self-directed or autonomous manner.

#### General skills:

CG1: Possessing the knowledge, skills and abilities necessary to carry out innovative work in the field of technologies for Health and Welfare.

CG2: Ability to write technical documents or reports describing a novel application in the field of technology for Health and Welfare, as well as knowledge of mechanisms to protect or distribute it.

CG3: Searching, managing, understanding and critically analysing scientific publications, bibliography and documentation in the field of Health and Welfare Technologies.

CG4: Starting a research career in the field of Health and Welfare Technologies with guarantees.

CG5: Leading, managing and developing research and development projects in innovation in the field of Health and Welfare Technologies.

#### Specific skills:

CE4: Analysing and applying the necessary steps for the marketing of a product or device for Health and Welfare, interpreting and applying the necessary design, manufacturing and approval regulations.

CE8: Analysing biomedical data and extracting relevant information from it for the resolution of problems in the field of Health and Welfare Technologies.

### 2.2. Learning goals

- The student knows the scientific method, identifying the different methodologies and research designs and determining the methodological quality of an investigation. The student distinguishes between reliability and validity, identifying the most appropriate statistical parameter for the calculation of reliability and differentiating the different types of validity.
- The student knows the types of projects and the specifications of the technical projects that deal with Health and Welfare. The student is able to publicize and protect the results of research.
- The student is capable of summarizing and representing data sets, as well as making comparisons with more than one population.
- The student is able to apply data processing and statistical analysis techniques to extract knowledge from the data.
- The student is able to organize large amount of data and analyze them by applying dimension reduction techniques.
- The student is able to use computer programs for data processing.

### 2.3. Importance of learning goals

Any R+D+i project must be carried out following principles based on the scientific method. In a culture of entrepreneurship in innovation such as that pursued by this master's degree, students cannot be unaware of these principles. Therefore, this subject is essential. In addition, students will be able to learn other essential aspects in practice to obtain financing for projects and the presentation of research results. Finally, it is worth noting the known phenomenon of the large amount of data that can be obtained from current research. For this reason, training in data processing techniques becomes more relevant, without which it is impossible to obtain objective conclusions from our projects.

## 3. Assessment (1st and 2nd call)

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

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities:

#### DURING THE TEACHING PERIOD:

1) Evaluable practices and activities (70%)

Computer practices will be carried out to illustrate the theoretical concepts as well as various evaluable activities (for example, assignments, exercises, tests) throughout the course. As a whole, it is intended to encourage continuous study.

The specific activities to be carried out will be communicated through the learning platform <http://moodle.unizar.es/>.

Grade: CP from 0 to 10. The evaluable Practices and activities are in total 70% of the global mark of the subject. It is necessary to obtain a minimum grade of 4 out of 10 in this part to pass the course.

#### **GLOBAL TEST (OFFICIAL CALLS, 100%)**

1) Final exam: Grade CF from 0 to 10 points. It will account for 30% of the overall grade. It is necessary to obtain a minimum grade of 4 out of 10 to pass the course. There will be an exam to assess the theoretical and practical knowledge of the subject.

2) Evaluable practices and activities: grade CP from 0 to 10 points. It will account for 70% of the overall grade. It is necessary to obtain a minimum grade of 4 out of 10 to pass the course. Intended for those students who have not passed the evaluable practices and activities in the teaching period or who want to improve the grade obtained. The format of this test will be indicated in each course, and may include practical tests, exams, oral presentations or other formats.

FINAL GRADE: If the student has reached 4 points in both CP and CF, the global grade is obtained from them as:  $0.7 \times CP + 0.3 \times CF$ . In case the student has not reached 4 points in one of the two parts, he/she will fail the subject, with the grade obtained as the minimum between these two values: 4 and  $0.7 \times CP + 0.3 \times CF$ .

## **4. Methodology, learning tasks, syllabus and resources**

### **4.1. Methodological overview**

The course will be presented in an eminently practical way. Although there will be some face-to-face lectures, the subject will be focused on solving numerous problems and practical cases, as well as carrying out practices and assignments so that the student learns by doing, always with the guidance of the teacher. The student will have the material to follow the subject in an online way, although some classes and practices will be face-to-face for those who can go to the university, thus promoting greater contact and knowledge between students and teachers.

The subject material corresponds to the English-Friendly format.

### **4.2. Learning tasks**

The learning activities are indicated below, together with the estimate of student work time corresponding to 9 ECTS:

T1: Lectures: 6 h.  
T2: Practice sessions: 29 h.  
T3: Laboratory practices: 10 h.  
T6: Assignments: 81 h.  
T7: Autonomous study: 95 h.  
T8: Evaluation: 4 h.

### **4.3. Syllabus**

#### **Part 1: Scientific method**

- Section 1. Science, methodologies and research designs. Science and the scientific method. Research methodologies. Research designs.
- Section 2. Research projects. Types of projects. Considerations in technological projects in Health and Welfare. Sources of funding.
- Section 3. Research results. Writing scientific articles. Protection of results.
- Section 4. Reliability and validity. Reliability and construct validity. Validity from a methodological perspective.

#### **Part 2: Data analysis**

- Section 1. Review of basic concepts. Descriptive statistics, probability distributions and statistical inference.
- Section 2. Regression models. Linear regression. Other advanced regression models. Case analysis.
- Section 3. Multivariate statistical methods. Dimension reduction methods. Partition and classification methods. Case analysis.
- Section 4. Computer tools for data analysis in engineering.

### **4.4. Course planning and calendar**

Most of the learning activities will be carried out without requiring physical co-presence of teachers

and students. Some classes will be taught face-to-face with a schedule defined by the Center and published prior to the start of the course, although attendance will not be compulsory and some form of distance learning alternative will be provided for those who wish. Teachers will also set a tutorial schedule.

The detailed schedule of the course activities to be carried out will be established once the University and the Center have approved the academic schedule (which may be consulted on the Center's website).

The dates of the exams of the official calls are set by the management team of the Center.

The list and schedule of the course activities, along with any kind of information and documentation on the subject, will be published at <http://moodle.unizar.es/> (Note. To access this website the student must be enrolled).

#### **4.5. Bibliography and recommended resources**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=68954>