

Academic Year/course: 2021/22

## 30174 - Management of Innovation and Technology Policy

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 30174 - Management of Innovation and Technology Policy

**Faculty / School:** 179 - Centro Universitario de la Defensa - Zaragoza

**Degree:** 563 - Bachelor's Degree in Industrial Organisational Engineering

**ECTS:** 4.5

**Year:** 3

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

### 1.1. Aims of the course

- to identify types and strategies of innovation and technological development in organizations.
- to design, implement, and know systems of technological surveillance and foresight, especially in the field of defence.
- to choose the appropriate intellectual property right to benefit the most from innovation results.
- to plan R&D and innovation projects in accordance with technological and corporate strategies.
- to set out and decide the cancellation of the development of innovations.
- to know the structure of public incentives aimed at promoting innovations, especially in the field of defence.
- to value R&D cooperative agreements with other firms and research centers.
- to write project proposals to apply for publicly-granted R&D funds, especially in the field of defence.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the results of Learning the subject provides training and competence to contribute to a certain extent to its achievement ?. Specifically, on objective 5 of gender equality in research work is reflected when analyzing the science and technology systems of a country. And objective 9 on industry, innovation and infrastructures is also cross-sectionally studied when analyzing systems, assessing the spillover effect of innovations and their contribution to economic and social well-being. Other ethical aspects regarding technological development and dystopias are also considered when it comes to technology foresight.

### 1.2. Context and importance of this course in the degree

The subject, being located after the halfway point of the degree, allows students to apply the knowledge acquired in other previous subjects, both economic and scientific-technical in nature that will provide them with background for their better performance in it. Students are expected to be able to identify technologies and knowledge about which they are independently informed and that allow them to organize solutions to complex problems from a strategic management perspective in the form of a project.

This subject contributes to the training of Army Officers by developing skills to search for information and evaluate the insertion of technologies with an interest in the areas of Security and Defense, knowledge of innovation management systems (both through large development programs, such as through other more agile tools) that make it possible to incorporate new features in the materials needed by the Armed Forces. It also provides knowledge about the legal system for the protection of inventions.

The future officer needs to know the Spanish and European entities with which there is technological collaboration to make it possible to contribute to the development of military capabilities, providing advanced technological solutions that contribute to the achievement of the principle of operational advantage in their employment and freedom of action. An operational advantage is considered the position of superiority over potential enemies that must be sought and preserved in confrontational situations and also in the protection of people and facilities. This advantage is based on factors such as intelligence, training or doctrine, but is strongly linked to systems and technologies. Regarding freedom of action, it is the power to decide the use of the Armed Forces and their capabilities, to act according to their own interests, without being subject to other states or

entities, within the framework of the Spanish legal system and the international legality, so there must be a national technological and industrial base with a strategic nature. By taking this course, the current status of all these issues is known and the future officer is trained so that he or she can learn about these issues when requested by the service.

### 1.3. Recommendations to take this course

This course does not make use of any skills beyond those taught in the scientific stream of high school. However, familiarity with the basics of economic management, as taught in the 1st-year course Fundamentals of Administration, is welcome.

## 2. Learning goals

### 2.1. Competences

1. Knowledge and capacities to direct technological changes in organisations, especially within the framework of public innovation systems and in the field of defence.
2. Ability to plan, budget, organise, manage and monitor tasks, people and resources.
3. Ability to combine both general and specialised engineering knowledge to produce innovative and competitive proposals within the scope of professional practice.
4. Ability to solve problems and take decisions with initiative, creativity and critical reasoning.
5. Ability to apply Information and Communication Technologies (ICTs) within the field of engineering.
6. Ability to communicate knowledge and skills in Spanish.
7. Ability to work in a multidisciplinary group and in a multilingual setting.
8. Ability to continue learning and develop self-learning strategies.

### 2.2. Learning goals

1. To design and implement strategies of innovation and technological development in organizations.
2. To design and implement systems of technological surveillance to defend against competitors and to take advantage of business opportunities in the market. To use the patent system as a means of protecting innovations and identifying competitive opportunities.
3. To know efficient systems of technological transfer or cooperation to improve the competitiveness of the organization.
4. To evaluate and select the most appropriate R&D and innovation proposals according to the firm's technological innovation strategy.
5. To manage the development of innovations (new products and productive processes) identifying the appropriate course of action for their proper planning and management.
6. To set out and decide the cancellation of the development of innovations.
7. To know the principles of training and management of multidisciplinary teams for the development of innovations.
8. To know the structure of public incentives aimed at promoting innovations.
9. To reach and manage R&D cooperative agreements with other firms and research centers.
10. To identify and know how to use external funding sources available in public innovation systems for carrying out innovation activities.
11. To write project proposals to apply for publicly-granted national and international R&D funds.

### 2.3. Importance of learning goals

This course will make students more proficient to:

1. Manage their own experience and knowledge, as well as those of other members of their organization, to achieve operational improvements, ideas proposals and innovative alternatives which improve products, productive processes and logistics, and organizational systems.
2. Plan changes that improve global systems based on scientific-technical knowledge and management.

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

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

#### FIRST CALL

Continuous assessment:

The students will be able to pass the total of the subject by the continuous evaluation procedure. To do this, they must demonstrate that they have achieved the expected learning outcomes by passing the evaluation instruments indicated below which will be carried out throughout the semester:

1. Assessment instrument 1 - Consists of the assessment of individual practice of the contents of unit 1 that will be developed in the classroom and with all the materials that are desired available but communication devices (tablets, computers, mobile phones) may not be used for any type of consultation. Its weight in the final grade is 20%.
2. Assessment instrument 2 - Consists of the assessment of individual exam will consist of a series of short questions and a test on the contents of unit 1 and part of 2 (2.1, 2.2 and 2.3) without support materials. Its weight in the final grade is 15%.
3. Assessment instrument 3 - Consists of the assessment of scientific-technological essay on technological prospective based on group dynamics on a roadmap carried out in class, and deliverable individually by Moodle. Its weight in the final grade is 10%.
4. Assessment instrument 4 - Consists of the assessment of a group practice based on the analysis of a technology aligned with the Technology and Innovation Strategy for Defense on part of the contents of unit 2 (2.4 and 2.5) and topic 3 deliverable via Moodle that will be developed from the class sessions. Its weight in the final grade is 20%.
5. Assessment instrument 5 - Consists of the assessment of an individual practice based fundamentally on the calculations of the contents of unit 4. It will be developed in the classroom with all the materials that are desired available but communication devices (tablets, computers, mobile phones) may not be used for any type of consultation, only a calculator. Its weight in the final grade is 20%.
6. Assessment instrument 6 - Consists of the assessment of individual exam will consist of a series of short questions and a test on the contents of unit 5 and 6 without support materials. Its weight in the final grade is 15%.

In the final mark of the continuous assessment (100%) all the tests of the evaluation instruments carried out throughout the course and its weight will be taken into account. To pass the subject, the student's final grade must be equal to or greater than 5.

Global Test:

The students who do not pass the subject by continuous assessment or who would like to improve their grades, will have the right to take the Global Test set in the academic calendar, prevailing, in any case, the best of both grades. This global test will be equivalent to the continuous assessment test described and will have the 100% weight in the final grade. This test will consist of an individual exam made up of theoretical, theoretical-practical, and practical questions on the contents of units 1-6. To pass the subject, the student's final grade must be equal to or greater than 5.

#### SECOND CALL

Global Test:

The students who do not pass the subject in the first call may take the Global Test set in the academic calendar for the second call. This Global Test will consist of an individual exam made up of theoretical, theoretical-practical, and practical questions on the contents of units 1-6. To pass the subject, the student's final grade must be equal to or greater than 5.

#### ASSESSMENT CRITERIA

In the theoretical, theoretical-practical and practical tests, knowledge of the study topics and interpretation of the questions raised in accordance with the contents.

In the group practice, the content provided, the design of the search methodology, the technological analysis carried out, the coherence between sections, the correct presentation of the bibliography and the general design will be valued.

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

### 4.1. Methodological overview

The learning process that has been designed for this subject is based on continuous interaction according to the following methodology:

1. Lectures in which the theoretical foundations of the subject content and the most important methods for solving problems and practical cases are presented. In these classes the participation of the students will be encouraged, especially in the topics that the debate fosters knowledge.
2. Practical classes in which cases of the fundamentals presented in the lectures are carried out, with the possibility of exposing them by the students.
3. Tutored specialization work, carried out in a group of the students' choice on defense technology, preferably aligned with the Defense Technology and Innovation Strategy (ETID).
4. Personalized attention to the student through tutorials. These can be both individual and group and, likewise, face-to-face or virtual.
5. Possibility of carrying out any other activities that the teacher considers appropriate to achieve the learning objectives set (such as collection of exercises, dynamics, projection of audiovisual documents, visits and / or conferences of experts, etc.). For the evaluation, the practices and exams will be taken into account, granting the practices carried out during the delivery of a contribution to the final grade. In order to add the final exam grade to those obtained during the tests and exams during the course, a minimum grade will be required.

## 4.2. Learning tasks

Theoretical classes, practical cases and tutored work in the classroom and applied.

1. Throughout the semester there will be tests, practical cases and compulsory assignments in the classroom, part of them evaluable. They can be done individually and / or in small groups.
2. Group work will be carried out on innovation in any of the technologies with interest in security and defense. It will be short (including index, content, bibliography and annexes).
3. Final exam: it will take place at the end of the semester. Its purpose is to measure the overall result of individual learning. It will consist of a single written test with theoretical and / or theoretical-practical questions with open response and / or multiple choice.

## 4.3. Syllabus

The course will address the following topics:

1. Innovation management
2. Technology audits, Technological Surveillance systems and Technology Foresight
3. IPR: *Intellectual property rights*
4. Selection and management of innovative developments
5. Technology Transfer and Cooperation
6. Innovation Systems

## 4.4. Course planning and calendar

The lectures and practical classes will be given according to the timetable established by the Center, which can be consulted on the website: <http://cud.unizar.es>. The rest of the activities will be announced on the Moodle platform well in advance. Starting from topic 2, a session will be dedicated to favor the preparation of mandatory work on innovation in security and defense technologies: search for scientific-technical information, patent analysis, etc. The dates of the examination sessions will be those officially published on the centre's website.

## 4.5. Bibliography and recommended resources

Bibliography:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30174>