

Academic Year/course: 2021/22

## 27449 - Innovation, Growth and Sustainability

### Syllabus Information

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**Academic Year:** 2021/22

**Subject:** 27449 - Innovación, crecimiento y sostenibilidad

**Faculty / School:** 109 - Facultad de Economía y Empresa

**Degree:** 417 - Degree in Economics

**ECTS:** 5.0

**Year:** 4

**Semester:** Second semester

**Subject Type:** Optional

**Module:**

## 1. General information

### 1.1. Aims of the course

Of the three main objectives set for the degree, the first two refer to the knowledge of "the nature of the economy and the immediate and mediate, national and international economic environment" and to the "models and techniques of representation and interpretation of economic reality", respectively. This optative subject is dedicated to completing the contribution made by the subjects of Macroeconomics and Microeconomics.

The subject and its expected results respond to the need to complete the student's training for a competent and professional development of his work as an economist. With the content provided, the student will have a sufficiently broad perspective of the mechanisms of growth, innovation and sustainability, being able to act with the necessary knowledge if they are to carry out the work of manager in the field of innovation or sustainability. In any case, he will have acquired the perspective of some areas of economic progress that are of great importance today.

These approaches and objectives are aligned with the Sustainable Development Goals (SDG) of the United Nations 2030 Agenda number 1, 3, 8, 9, 11 and 13, in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to its achievement.

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

Due to its location in the second cycle - fourth year - of the study program, the subject applies knowledge already acquired in other compulsory subjects and basic training such as Mathematics I and Mathematics II (Basic linear algebra, Differential calculus, Optimization), Principles of Economics, Microeconomics I, II, III and IV, Macroeconomics I, II, III and IV, Economic History, Statistics I and II, Econometrics I, II and III.

On the other hand, receiving a good training in this optional subject leaves the student in perfect disposition to adequately placed knowledge of Economic Policy, Spanish Economy, Regional and International Economy, Public Economy, Economic Growth, Financial Economy or Labor Economy.

### 1.3. Recommendations to take this course

A good level of macroeconomics, microeconomics and calculus is recommended.

## 2. Learning goals

### 2.1. Competences

Upon passing the subject, the student will have acquired the following competences.

#### *Specific competences*

E7. Identify and anticipate relevant economic problems in relation to the allocation of resources in general, both in the private and public spheres.

E8. Provide rationality to the analysis and description of any aspect of economic reality.

E17. Use deductive reasoning in conjunction with models to explain economic phenomena.

#### *Generic competences*

G2. Capacity to solve problems.

G16. Sensitivity towards environmental and social issues.

G17. Motivation for quality and innovation.

## 2.2. Learning goals

In order to pass this subject, the student must demonstrate sufficient knowledge of the role that innovation plays in economic growth, as well as the conditions that such growth must meet in order to qualify as sustainable from the point of view of the availability of natural resources.

The student, passing this subject, will be able to:

- a) Differentiate the different types of technical change that can occur, understanding by such the modifications of the productive processes capable of providing a higher level of production for a given combination of productive factors.
- b) Understand the relevance of the possible limits to growth that the availability of natural resources may pose.
- c) Describe the role that innovation plays in growth mechanisms that require technical change.
- d) Distinguish the different types of innovation and the different roles they play in the economy according to the type of technical change that originates economic growth.
- e) Identify the mechanisms by which certain limits imposed by natural resources on growth force changes in resource allocations to guarantee the sustainability of that growth.
- f) Design innovation policies appropriate to growth and sustainability aimed at achieving optimal resource allocations.

## 2.3. Importance of learning goals

The student will be able to understand the mechanisms by which innovation is fundamental for economic progress, how the challenges posed to it by sustainability can be overcome, and the economic policies that help to improve what both concepts represent for that progress.

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

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

### *Evaluation activities*

1. A final exam where the acquisition of knowledge from the program of the subject is valued. The aforementioned exam will consist of a series of questions of a theoretical-practical nature.
2. Carrying out voluntary tests in the class schedule that will adjust to the theoretical and practical contents of the subject. Voluntary tests consist of presenting the resolution of exercises on the blackboard. Each entry can score as 0.5 out of 10.

It is planned that these tests will be carried out in person but if health circumstances require it, they will be carried out blended or online. In the case of online assessment, it is important to note that, in any test, the student may be recorded, and he may exercise his rights through the procedure indicated in:

[https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia\\_reducida.pdf](https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia_reducida.pdf)

The necessary software will be used to verify the originality of the activities carried out. The detection of plagiarism or copying in an activity will imply a score of 0 points in it.

### *Evaluation criteria and qualification*

The qualification of the different evaluation activities will be carried out through the evaluation procedures indicated below:

1. Final exam + voluntary tests: the final exam will represent a minimum of 80% of the grade and voluntary tests a maximum of 20%.
2. Only final exam, the result of which will be 100% of the grade.
3. Both procedures will allow, where appropriate, to pass the subject with the highest grade. The procedure chosen will always be the one that is most favorable for the student.

The qualification of the voluntary tests will be made public by the professors sufficiently in advance so that, in any case, it is known by the interested parties before the completion of the final exam.

The evaluation of the subject in the last two calls to which a student may apply, or in the extraordinary if any, will be carried out before a court, in accordance with the provisions of Art. 23 of the Regulation of Learning Assessment Standards of the University of Zaragoza. The student may choose to take the global assessment test together with the rest of the students in the group and, later, it will be delivered to the court for evaluation.

### *Evaluation criteria*

The evaluation will take into account:

1. The analytical correction.
2. The reasoned and coherent explanation of the arguments used.
3. The correct and timely use of economic concepts.
4. The level of knowledge and management of the techniques developed in class to solve the practical exercises.

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

### 4.1. Methodological overview

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

1. Participatory master classes. In them, the teacher will explain the fundamental contents of the subject. The student must complement the explanations with the recommended bibliography.
2. Practical classes. In them, students will solve practical exercises, always under the teacher's supervision.

### 4.2. Learning tasks

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

- 1.- Theoretical classes: Credits 1. Methodology: Attendance to classes and participatory problem solving.
- 2.-Practical classes: Credits: 1. Methodology: Attendance to classes, problem solving and case studies applying the precise technical tools.
- 3.-Tutorials and seminars: Credits: 0.5. Methodology: Tutoring and complementary activities.
- 4.-Personal work: Credits: 2.5. Methodology: Resolution of exercises. Use of ICT. Work preparation and exam preparation.

The teaching methodology is expected to be face-to-face. However, if necessary for health reasons, face-to-face classes will become fully or partially online.

### 4.3. Syllabus

#### **LESSON 1. INTRODUCTION: INTERACTIONS BETWEEN INNOVATION, ECONOMIC GROWTH AND SUSTAINABILITY**

1. ECONOMIC GROWTH: Empirical and theoretical panoramical view. The decrease of the capital productivity. Solow residual. Exogenous and endogenous growth models. A practical case: Spain 1960-2007.
2. THE CONECTION INNOVATION-ECONOMIC GROWTH: Types of technological change.
3. THE CONECTION ECONOMIC GROWTH-SUSTAINABILITY: The limits to the sustainability of the economic growth.
4. THE INTERACCIÓN SUSTAINABILITY- ECONOMIC GROWTH- INNOVATION: The need of closing he circle.
5. OUTLINE OF THE CONTENT AND THE DEVELOPMENT OF THE COURSE.

#### **LESSON 2. MODELS OF ECONOMIC GROWTH WITH ONE SECTOR OF ACCUMULATION**

1. RAMSEY MODEL WITHOUT TECHNICAL PROGRESS.
2. RAMSEY MODEL WITH TECHNICAL PROGRESS.
3. AK MODEL.
4. AN AK MODEL AS REDUCED FORM OF GROWTH WITH KNOWLEDGE DIFFUSION.
5. AN AK MODEL AS REDUCED FORM OF GROWTH WITH PUBLIC INFRASTRUCTURES.

#### **LESSON 3. MODELS WITH ECONOMIC GROWTH WITH TWO ACCUMULATION SECTORS**

1. A MODEL OF EXPANSIÓN OF THE VARIETY OF INTERMEDIATE GOODS.
2. A MODEL OF EXPANSION OF THE VARIETY OF FINAL GOODS.
3. THE IMPORTANCE OF EDUCATION AND HUMAN CAPITAL IN THE ECONOMIC GROWTH PROCESS.
4. SCHUMPETERIAN MODELS OF ECONOMIC GROWTH
5. GPT: GENERAL PURPOSE TECHNOLOGÍES

#### **TEMA 4. MODELS OF ECONOMIC GROWTH WITH SUSTAINABILITY IMPLICATIONS**

1. THE CONCEPTS OF NATURAL CAPITAL AND CIRCULAR ECONOMY.
2. ECONOMIC GROWTH WITH RENEVABLE NATURAL RESOURCES.
3. ECONOMIC GROWTH WITH NON-RENEVABLE NATURAL RESOURCES.
4. ECONOMIC GROWTH AND THE ENVIRONMENT QUALITY.

#### **LESSON 5. RESEARCH, DEVELOPMENT AND INNOVATION POLICIES**

1. COMPETITION AND INNOVATION. INSTRUMENTS OF PUBLIC INTERVENTION.
2. EXTERNALITIES AND INNOVATION. INSTRUMENTS OF PUBLIC INTERVENTION.
3. EDUCATION POLÍCIAS.
4. PATENT POLÍCIAS.

#### **LESSON 6. SUSTAINABILITY POLICIES**

- 1.- DISCUSSION ON THE CONCEPT OF SUSTAINABILITY.

2.- RENEVABLE RESOURCES. INSTRUMENTS OF PUBLIC INTERVENTION.

3.- NON-RENEVABLE RESOURCES. INSTRUMENTS OF PUBLIC INTERVENTION.

4.- ENVIRONMENT QUALITY. INSTRUMENTS OF PUBLIC INTERVENTION.