

Master in Agricultural Engineering

Duration: 1,5 years

Language: Spanish

Modality: personal attendance

Dissertation – ECTS: 12

Internship – ECTS: 6

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Goals / Objectives:

The Master in Agricultural Engineering is oriented towards training engineer with high-level skills, capable of weaving themselves into the fabric of an agri-food sector that is modern, productive, sustainable and environmentally friendly.

This Master confers its holder specific professional responsibilities regulated by law, which are similar to those of a traditional Agricultural Engineer.

An Agricultural Engineer is a professional of high value for any modern agribusiness. Owing to their solid interdisciplinary university training, Agricultural Engineers contribute to the company's activities the necessary knowledge and techniques and create profitable work methods of the highest quality, so that it can compete in the current productive globalised economy.

Subjects of plan:

The Master in Agricultural Engineering corresponds to level 3 of the Spanish Qualifications Framework for Higher Education (MECES) and to level 7 of the European Qualifications Framework (EQF). The Study Plan consists of 90 European credits (ECTS)

split into 1,5 academic years, with 3 semesters, each of them including a workload of 30 credits.

The training is divided into the following subject types: Compulsory subjects (72 ECTS); Internship (6 ECTS); Master dissertation (12 ECTS).

All of the subjects are semester-long and are grouped into the following modules:

MODULE 1: Technology and planning of the rural environment (27 ECTS)

MODULE 2: Technology in crop and livestock production (24 ECTS)

MODULE 3: Technology in agri-food industries (10,5 ECTS)

MODULE 4: Management and organization of agri-food companies (10,5 ECTS)

MODULE 5: Internship (6 ECTS)

MODULE 6: Master thesis (12 ECTS)

Year	Semester	Subject	Type	ECTS	Module	Year	Semester	Subject	Type	ECTS	Module
1	1	60560 Food quality and safety	Cm	4.5	M3	1	2	60566 Rural facilities and roads	Cm	6	M1
1	1	60561 Rural infrastructure	Cm	6	M1	1	2	60567 Animal production systems	Cm	9	M2
1	1	60562 Agri-food marketing	Cm	4.5	M4	1	2	60568 Plant production systems	Cm	9	M2
1	1	60563 Agricultural land-use planning and management	Cm	4.5	M1	1	2	60569 Systems and processes of food industries	Cm	6	M3
1	1	60564 Agricultural and rural development policies	Cm	4.5	M1						
1	1	60565 Water resources and hydraulic facilities	Cm	6	M1						
2	1	60570 Biotechnology in plant and animal breeding	Cm	6	M2						
2	1	60571 Agri-food business management	Cm	6	M4						
2	1	60572 Internships	Cm	6	M5						
2	1	60573 Master dissertation	Ds	12	M6						

Cm: compulsory; Ds: dissertation.

Study programs:

BRIEF DESCRIPTORS OF COURSES

Year	Semester	Subject	Type	ECTS	Module	Aims
1	1	60560 Food quality and safety	Cm	4.5	M3	It is essential that the agri-food industry guarantees the safety of food adapting the production processes to a European legislative framework very demanding with the health and consumers' protection. The subject "Food Quality and Safety" train professionals to develop this activity in the framework of food safety. The knowledge that students acquire in this subject is: - Legislation on food safety and traceability. - Application of systems to achieve traceability in food industries. - Implementation of the main quality and food safety systems in different food industries.
1	1	60561 Rural infrastructure	Cm	6	M1	The aims of the course are: Knowing how to project some of the most common rural infrastructures in the field of agronomic engineering: concrete foundations, concrete slabs, concrete floors, retaining walls, concrete structural walls.
1	1	60562 Agri-food marketing	Cm	4.5	M4	The aim of this subject is to introduce and habituate the students to the basic concepts, instruments and decisions related to marketing. To do this, the commercial activities of the company will be analysed, stressing the marketing tools that favour the efficacy and efficiency of these commercial activities.
1	1	60563 Agricultural land-use planning and management	Cm	4.5	M1	
1	1	60564 Agricultural and rural development policies	Cm	4.5	M1	The subject and its expected results respond to the following approaches and objectives: Familiarize the student with the need, the principles, methods and consequences of the economic policies applied to the Agri-Food Sector and the Rural Environment. It is fundamental that the student understands the institutional framework in its different scales and is able to discern what are the competences of the different estates involved in the planning, management and regulation of agri-food activity and rural development and, consequently, in the process of decision making. It is intended that students adopt a critical position when assessing the economic policies that affect the sector where they will develop their professional activity as an agronomist, thus adopting an active and not only receptive attitude.
1	1	60565 Water resources and hydraulic facilities	Cm	6	M1	To know the concepts, procedures and professional technologies that allow the management of river basins and the design of free flow water distribution systems oriented to applications in irrigation (but also of interest in other agricultural and agroindustrial fields). To provide analytical tools for water resources planning and for open flow hydraulics modelling, allowing advanced river basin management and design of channels that transport water from the primary sources of water to the plots where irrigation applications take place, including aspects of channels control. The subject also covers the design and analysis of the hydrodynamics of surface irrigation.
1	2	60566 Rural facilities and roads	Cm	6	M1	This course and its expected outcomes respond to the following approaches and objectives: That the student acquires the knowledge and technical skills that will allow him/her to be able to perform the dimensioning and justificatory

						<p>calculations associated with some of the following rural facilities: small dams and irrigation pools for agricultural use, rural roads, electric power transforming stations (distribution substations) and low-voltage power distribution grids.</p> <p>SDGs alignment:</p> <p>Aforementioned goals are aligned with the following UN Sustainable Development Goals (SDGs):</p> <ul style="list-style-type: none"> ● SDG 6: Ensure access to water and sanitation for all. ● SDG 7: Ensure access to affordable, reliable, sustainable and modern energy. ● SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. <p>and, in particular, with the following targets:</p> <ul style="list-style-type: none"> ● <i>Target 6.4</i>: By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity. ● <i>Target 6.5</i>: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate. ● <i>Target 7.1</i>: By 2030, ensure universal access to affordable, reliable and modern energy services. ● <i>Target 7.3</i>: By 2030, double the global rate of improvement in energy efficiency. ● <i>Target 7.A</i>: By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology. ● <i>Target 9.1</i>: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. ● <i>Target 9.4</i>: By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.
1	2	60567 Animal production systems	Cm	9	M2	
1	2	60568 Plant production systems	Cm	9	M2	The main aim is that students know, develop and apply the technologies in plant production systems and integrated crop protection, in order to achieve sustainability in these system management.
1	2	60569 Systems and processes of food industries	Cm	6	M3	<p>One of the specific aims of the Master in Agricultural Engineering is to train graduates to manage all kinds of food industries. The content of "Systems and processes of food industries" teaches the students to be able to know, understand and use the principles of engineering and basic food operations, apply the basic principles of unit operations used in the food industry, select the unit operations that need a specific food process, develop flow diagrams of food processes and apply the concepts acquired on basic operations in specific food industries. These objectives are aligned with some of the Sustainable Development Goals, (https://www.un.org/sustainabledevelopment/):</p> <ul style="list-style-type: none"> - Goal 9 "Build resilient infrastructure, promote sustainable industrialization and foster innovation" (target 9.4).
2	1	60570 Biotechnology	Cm	6	M2	

		in plant and animal breeding				
2	1	60571 Agri-food business management	Cm	6	M4	The agri-food sector has become one of the pillars of development and sustainability of large geographic areas that survive away from population centers. The sector has the important challenge of providing an income level to its inhabitants and few development opportunities to halt the eternal exodus and depopulation, breaking centric development models have emerged since the mid-twentieth century. That is why all agricultural activity must carry contemplated understanding of what factors allow arise, remain and progress to businesses that live in this environment are. The course aims to explain the markets that its products face, development, factors of competitiveness to achieve the objectives, supported by the development and understanding of logistics and value chain activity, and prepare to analyze the ability to generate results and financing activity.
2	1	60572 Internships	Cm	6	M5	The external practices are optional (6 credits). Through these practices, it is intended to offer direct training appropriate to the needs of companies. The external internships are managed through Universa, the Orientation and Employment Service of the University of Zaragoza, operating through an agreement with the Aragonese Employment Institute of the Government of Aragon. Universa establishes collaborative relationships with numerous companies and institutions, in order to organise internships for students. The follow-up of the practices is done through the figure of the tutors: an academic tutor belonging to the faculty of the Master and a professional tutor within the company or institution.
2	1	60573 Master dissertation (12 ECTS)	Ds	12	M6	The Master Dissertation is compulsory for all the students of the master in Agricultural Engineering. The key aim of the master dissertation is to enable students to apply and develop a range of skills and competences acquired during the master. The master dissertation requires a written report and there will be a public defense in accordance with the corresponding regulation.

Cm: compulsory; Ds: dissertation.

URL of the detailed description:

<http://eps.unizar.es/en/master-agronomic>

For courses descriptions and further information, see:

<https://estudios.unizar.es/estudio/ver?id=691>

For a list of active courses, see:

<https://documenta.unizar.es/share/s/cW989eIQQ9yzocVaSvF6BQ>

For a list of courses included in the English Friendly Program, see:

<https://eps.unizar.es/subjects-asignaturasef>

Teaching material for registered students is available on a Moodle platform:

<https://moodle2.unizar.es>

Technological College. Agri-food and Environment: <https://eps.unizar.es/>