

The adaptation and certification of the educational programs of Agricultural Engineering in the Spanish Universities



UNIVERSITAT
POLITÀCNICA
DE VALÈNCIA

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*The adaptation and certification of the educational programs
of Agricultural Engineering (AE) in the Spanish Universities*



AE Programs.
Adaptation to
EHEA and
accreditation

Academic
Programs in
Spain

UPV Learning
Outcomes



Before 2010: Single curriculum for the Agricultural Engineering Program (European Qualifications Framework, EQF 7): 5-6 academic years in almost all Spanish Universities (≈ 3900 contact hours).



The educational objectives of these two structures (Bachelor's Degree + Master's Degree) and the 5-year AE Educational Program are equivalent.

All Official Educational Programs in Spain have to be accredited by ANECA (National Agency for Quality Assessment and Accreditation), whose aim is to provide external quality assurance for the Spanish Higher Education System.

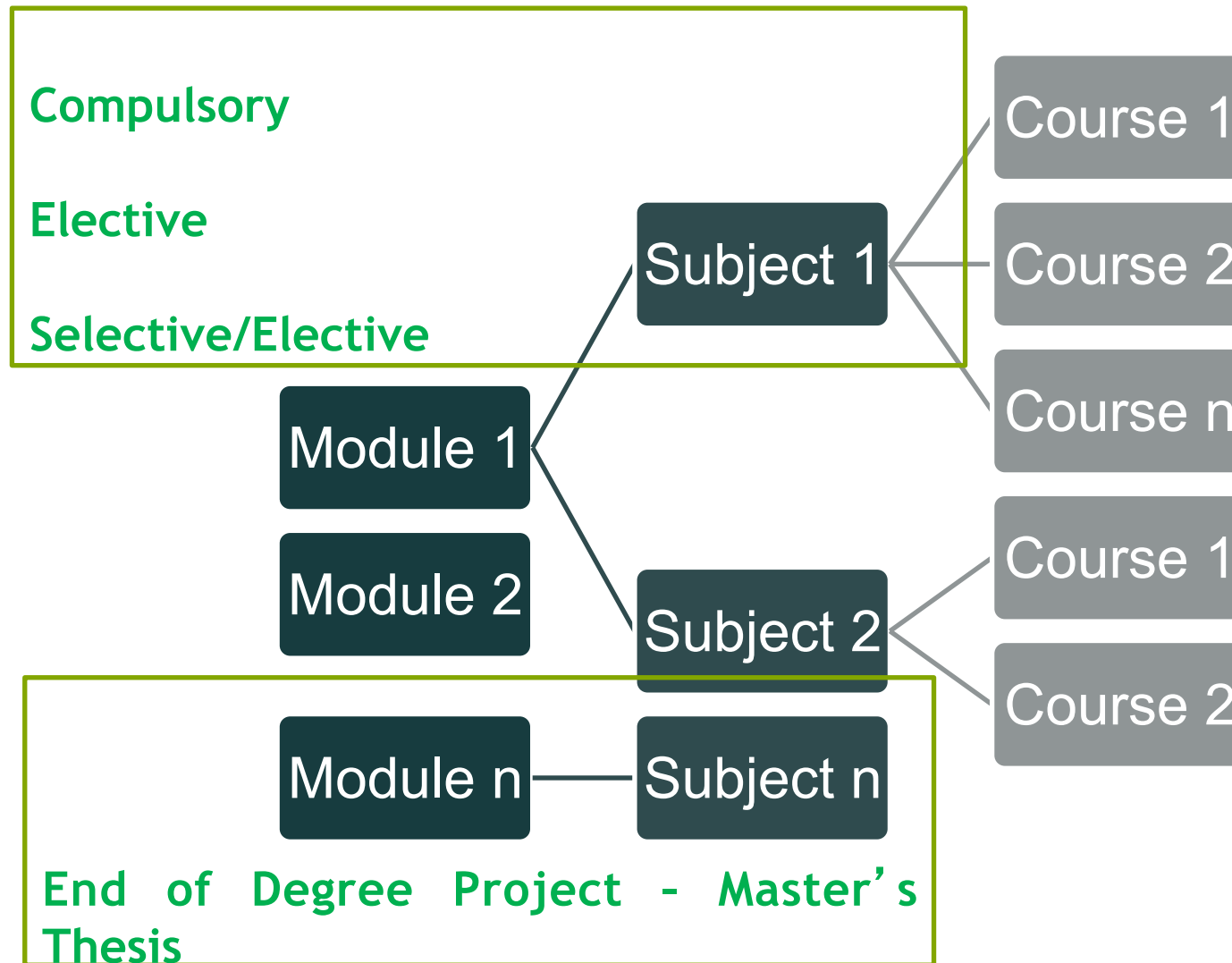


VERIFICA evaluates
degree proposals
designed according to
EHEA criteria.

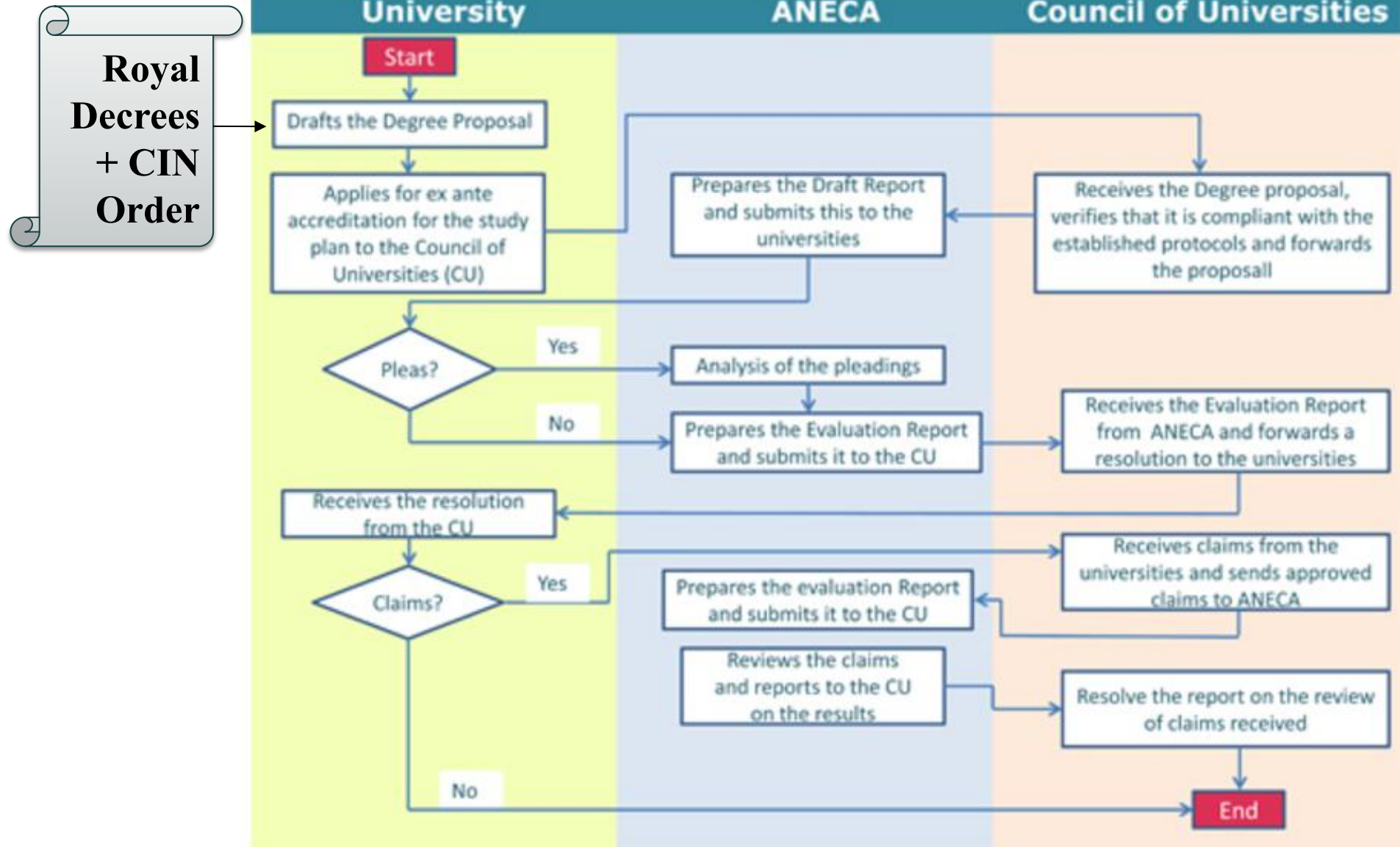
For Regulated Professions the core competences are included in Royal Decrees:

Agricultural Engineering (Master's Level) → Order CIN/325/2009 (Royal Decree 1393/2007) → *Specific conditions to be met by each Academic Program so that Graduates can carry out a certain professional activity.*

General Structure of the Spanish Educational Programs



Verification Process



ANECA's mission is to provide external quality assurance for the Higher Education System and to contribute to its constant improvement.

A period of renewal of accreditation based on quality parameters is established by the Council of Universities.



ACREDITA PLUS

Assessment for national accreditation and for International seals

The Engineering -to obtain EUR-ACE® accreditation seal

The EUR-ACE® label is a certificate awarded by an authorised agency to an HEI (higher education institution) in respect of each Engineering degree programme that has been assessed according to a series of set standards, in accordance with the principles of quality, relevance, transparency, recognition and mobility as provided for in the EHEA.



EUR-ACE: EUROpean ACcredited Engineer

EUR-ACE®

The European quality label for engineering degree programmes at Bachelor and Master level.

Awarded by ENAEE: European Network for Accreditation of Engineering Education

www.enaee.eu



Main Benefits for graduates

- Assurance that program meets high European and international standards and is recognized by employers in Europe.
- In countries where the engineering profession is regulated, **EUR-ACE®** labelled programs meet the educational requirements for becoming a Registered or chartered engineer.
- The label facilitates mobility as promoted by the EU Directive on Recognition of Professional Qualification.



Benefits for professional engineering organizations

Reassurance that graduates meet educational requirements. The label is the educational standard for the professional card.

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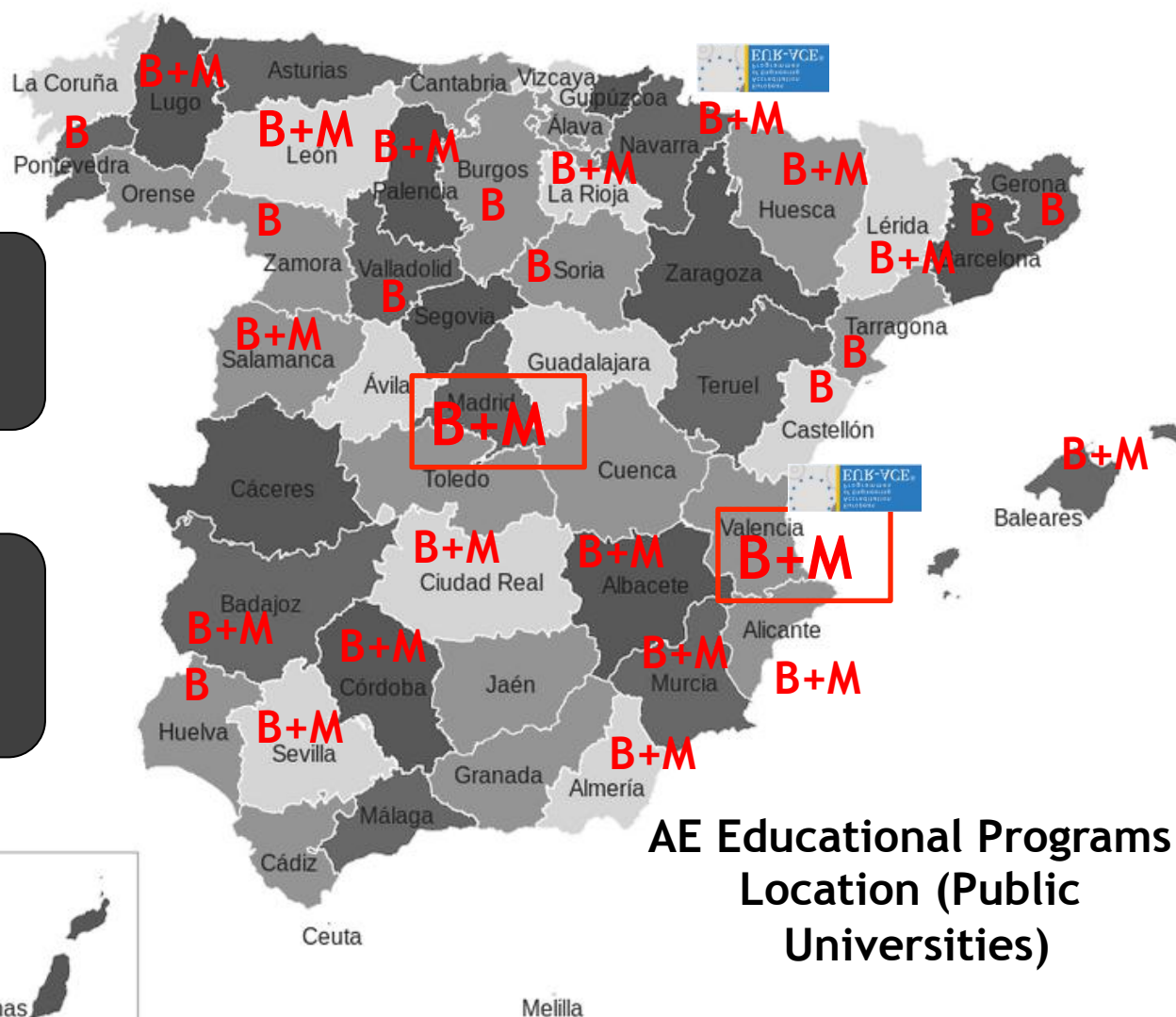
Bachelor's + Master's \geq 300 ECTS.
Master's \leq 120 ECTS



Bachelor's Degree (B)
4 academic years
(240 ECTS credits)



Master's Degree (M)
2 years
(90-120 ECTS credits)



**AE Educational Programs
Location (Public
Universities)**

20 Bachelor's + Master's



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Outstanding Academic Programs in Spain

Bachelor's Degree
4 academic years
(240 ECTS credits)

Master's Degree
(2 years)

UPM: 120 ECTS
UPV: 102 ECTS

Universidad Politécnica de Madrid, UPM

Universidad Politécnica de Valencia, UPV

| QS WORLD UNIVERSITY RANKINGS 2017 by subject | | |
|--|---|---|
| Agriculture & Forestry | | |
| # RANK | UNIVERSITY | |
| 2017 | University search | Spain |
| 51-100 |  Politécnica de Madrid |  |
| 51-100 |  Universidad Politécnica de València |  |



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**Bachelor's Degree, UPM;
(4 years, 240 ECTS credits)**



**Master's Degree in Agricultural
Engineering, UPM
(2 years, 120 ECTS credits)**

**Compulsory Basic Training Subjects
(70 ECTS)**

**Compulsory Subjects Common to the
agricultural branch
(85 ECTS)**

**Compulsory UPM Subjects
(9 ECTS)**

**Selective/Elective Subjects:
Mechanization and rural construction /
Agricultural and food industry/ Horticulture
and gardening
(52 ECTS)**

Elective Subjects: 12 ECTS

**END OF DEGREE PROJECT
(Bachelor's Thesis 12 ECTS)**

Technology and Rural Planning - 20 ECTS

**Technology of Animal and Crop Production
(22 ECTS)**

**Technology of Food Industries
(10 ECTS)**

**Management of Agrifood companies
(10 ECTS)**

Introduction to research: 5 ECTS

Projects: 5 ECTS

**Intensification Selective/Elective Subjects:
(36 ECTS)**
**Crop Production / Animal Production /
Livestock production / Agricultural and food
industry / Rural Engineering / Enviromental
Engineering / Rural Economy**

**END OF DEGREE PROJECT
(Master's Thesis 12 ECTS)**



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Bachelor's Degree + Master's Degree in Agricultural Engineering - UPV, 4+2 years (240 ECTS + 120 ECTS credits)

Basic Training -(60 ECTS)

**Compulsory Subjects Common to the
agricultural branch
(60 ECTS) - Includes Business**

**Compulsory Specific Technology:
Mechanisation and rural construction
(48 ECTS)**

Selective/Elective Subjects: 48 ECTS
Orientation in Natural resources and
the environment
Specific Technology in Horticulture and
gardening or in Animal production or in
Agricultural and food industry

Elective Subjects: 12 ECTS

**END OF DEGREE PROJECT
(Bachelor's Thesis 12 ECTS)**

Technology and Rural Planning - (20 ECTS)

**Technology of Animal and Crop Production
(20 ECTS)**

Technology of Food Industries - (10 ECTS)

**Management of Agrifood companies
(10 ECTS)**

Selective/Elective Subjects: 24 ECTS

Crop Production / Animal Production /
Science and Technology of Animal
production / Food industry / Rural
Engineering/ Enviromental Engineering /
Food Economy for Development /
Biotechnology /Natural Resources &
Environment

Elective Subjects - (6 ECTS)

**END OF DEGREE PROJECT
(Master's Thesis 12 ECTS)**



Minimum Requirements for Agricultural Engineering (Master's) Academic Programs:

| Module | ECTS | Competences/Specific Learning outcomes (Order CIN/325/2009) |
|---|------|---|
| 1. Technology of Rural Engineering and Rural Planning | 20 | Management of hydric resources (hydrology, hydrodynamics, hydraulic installations, irrigation) and equipment/installations that are integrated in the agrifood processes and productions. Agroindustrial buildings, infrastructures and rural paths. Rural planning and management. Landscape. Agricultural policies and rural development. |
| 2. Technology of Animal and Crop Production | 20 | Crop production systems. Integrated systems in Crop protection. Management of research projects and development of new technologies applied to crop or animal production: biotechnology and plant/animal breeding. Animal Production systems. Animal nutrition and hygiene. |
| 3. Technology of Food Industries | 10 | Food Industries production systems. Equipment, automatisms and process control systems for agrifood processes. Management of food quality and safety. Food analysis and food product traceability. |
| 4. Management of Agrifood companies | 10 | Market and business research. Marketing of agrifood products. Logistics. |
| Master's Thesis (6-30 ECTS) | | Professional Agricultural Engineering Project that synthetizes all the learning outcomes and competencies. |



Master's Degree in Agricultural Engineering - UPV
1st Academic Year (60 ECTS, Compulsory Subjects)

| Subject (Module) | Y / S | Course | ECTS |
|--|-------|--|------|
| BUSINESS ADMINISTRATION AND MARKETING OF AGRIFOOD COMPANIES (M4) | 1A | Business administration and management | 5 |
| | 1B | Agrifood Marketing | 5 |
| PLANT PRODUCTION TECHNOLOGY (M2) | 1B | Integrated Pest management | 5 |
| | | Management and productivity of agricultural systems | 5 |
| ANIMAL PRODUCTION TECHNOLOGY (M2) | 1A | Feed Processing Technology | 5 |
| | | Environmental Engineering in Animal Production | 5 |
| AGRIFOOD INDUSTRIES TECHNOLOGY (M3) | 1A | Food industry | 5 |
| | 1B | Safety and Traceability Management in the Agri-Food Industry | 5 |
| AGRICULTURAL AND RURAL POLICIES (M1) | 1B | Agricultural and Rural Policies | 5 |
| RURAL ENVIRONMENT TECHNOLOGY (M1) | 1A | Hydraulics Technology | 5 |
| | | Steel structures | 5 |
| | | Machinery and equipment for Agriculture | 5 |



Master's Degree in Agricultural Engineering - UPV

2nd Academic Year (42 ECTS, Elective Subjects)

| | | | |
|-------------------------------|----|---|----|
| Plant Production | 2A | Advanced technologies in protected horticulture | 6 |
| | | Advanced techniques for fruit tree crops | 6 |
| | | Physiological basis of plant production | 6 |
| | | Weed Science | 6 |
| Agrifood Industries | 2A | Design of Food Processes and Food Industries | 6 |
| | | Engineering of Auxiliary Units in Food Industries | 6 |
| | | Chemical transformations in Agrifood products | 6 |
| | | Biotechnological transformations in Agrifood products | 6 |
| Rural Environment Engineering | 2A | Rural Planning and Environmental impact | 6 |
| | | Electrical Installations and Transformer centres | 6 |
| | | Reinforced Concrete and Project Management | 6 |
| | | Climate control and refrigeration facilities in agricultural applications | 6 |
| Food Economy For Development | 2A | Food security policies | 6 |
| | | Agriculture and Cooperation for Development | 6 |
| | | Agroecosystems and Sustainability | 6 |
| | | Technologies and Innovations for Development | 6 |
| Career-oriented / Internships | 2A | Advanced Aquaculture | 6 |
| | | New Technologies for Agriculture | 6 |
| | | Biotechnology for Agronomic Applications | 6 |
| Master's Thesis | 2B | End of Degree Project | 12 |



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Master's Degree in Agricultural Engineering - UPV

UPV Learning Outcomes

01. Comprehension and integration
02. Application and practical thinking
03. Analyzing and solving problems
04. Innovation, creativity and entrepreneurship
05. Designs and projects
06. Teamwork and leadership
07. Ethical, environmental and professional responsibility
08. Effective communication
09. Critical thinking
10. Awareness of contemporary problems issues
11. Life-long learning
12. Planning and managing of time
13. Specific tools

Universal
chart of
the
Agronomist



07. Ethical, environmental and professional responsibility

Domain
Levels

- (1) Critically analyze one's own and others' judgments about reality.
- (2) Assess the consequences of professional activities in terms of social, environmental and economic impacts.
- (3) Coordinate and evaluate integral actions in the professional field, respecting the social, economic and environmental impacts.

Activities &
Evaluation

- Seminars, Case studies, role-playing, moral dilemmas, debate. Scores: A, B, C, D.

CONCLUSIONS

- ✓ The adaptation to the EHEA represented a **shift from the single curriculum for the AE Program** (5-6 years), to a Bachelor's Degree divided into four academic years (240 ECTS, EQF 6), plus a two-year Master's Degree (90-120 ECTS, EQF 7), with equivalent educational objectives and competences.
- ✓ The **specific conditions** to be met by each Academic Program (**core competences**) so that Graduates can carry out a certain professional activity are regulated by means of Royal Decrees (ORDER CIN).
- ✓ All Spanish Educational Programs must be accredited by the Council of Universities. The National Agency for Quality, Assessment and Accreditation provides **external quality assurance** and contributes to **continuous improvement**.
- ✓ The Universitat Politècnica de València has developed an **innovative Project** in order to evaluate **learning outcomes** that are completely aligned with the “**2015 Universal Charter of The Agronomist**”.



DANKE!

THANK YOU!

¡GRACIAS!



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