

# Master's degree in Plant Breeding

This master's degree no longer admitting students at UPC.

The main aim of the interuniversity **master's degree in Plant Breeding**, coordinated by the **Universitat Politècnica de València (UPV)** and with the **UPC as a participant**, is to provide professionals with the knowledge necessary to generate new varieties of plants and to develop genetic improvement programmes, combining traditional selection methods with new biotechnologies.

## GENERAL DETAILS

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### Duration and start date

Two academic years, 120 ECTS credits

### Timetable and delivery

Afternoons. Face-to-face

### Language of instruction

Spanish

Information on [language use in the classroom and students' language rights](#).

### Location

Universitat Politècnica de València (UPV). It is anticipated that the credits for the master's thesis will be carried out at the Universitat Politècnica de Catalunya (UPC) or the Universidad Politécnica de Madrid (UPM) when the subject is tutored by the teaching staff of one of these universities.

### Official degree

[Recorded in the Ministry of Education's degree register](#)

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## PROFESSIONAL OPPORTUNITIES

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### Professional opportunities

On completion of the master's degree, graduates will be recognised experts who may work in any of the following capacities:

- Business owners and specialists at different levels in obtaining, producing and marketing genetically improved plants.
- Specialist government employees controlling the registration and production of genetically improved plants.
- Researchers in the development and application of new plant breeding techniques.
- Specialists in the conservation of plant genetic resources.
- Specialists in plant genomics and marker-assisted plant breeding.
- Specialists in in-vitro culture and the genetic transformation of plants.
- Specialists in the regeneration of traditional plant varieties for local development.

### Competencies

#### Generic competencies

Generic competencies are the skills that graduates acquire regardless of the specific course or field of study. The

generic competencies established by the UPC are capacity for innovation and entrepreneurship, sustainability and social commitment, knowledge of a foreign language (preferably English), teamwork and proper use of information resources.

On completion of the master's degree, students should be able to:

- Define the principles of plant breeding.
- Describe conventional plant selection and breeding techniques.
- Schematise and apply biotechnology tools and techniques to improvement programmes.
- Select and apply improvement methods according to the reproductive system.
- Point out the singularities of improvement methods according to improvement plan objectives.
- Contrast the different types of experimental designs used in breeding.
- Describe the appropriate methods for exploring, handling, conserving and using plant genetic resources.
- List the singular features involved in the commercial production of seeds and nursery plants.
- Enumerate the regulations and legal instruments involved in recording, protecting and using plant material.
- Describe the main information sources for breeders.
- Discuss the principles of plant breeding research.
- Analyse the problems of real improvement programmes.
- Summarise the formulation of objectives and design of improvement programmes.
- Abstract the essential elements of a real breeding problem.
- Formally model real breeding problems.
- Execute real improvement programmes.
- Analyse and resolve complex plant breeding problems.
- Discuss the joint use of conventional selection and improvement methods and new biotechnologies in improvement programmes.
- Select the most appropriate tools and technologies for optimising improvement programmes.
- Rationalise the organisation of a germplasm bank and manage it.
- Use genetic resources in an improvement programme.
- Design experiments in the field of plant breeding.
- Handle the current legislation regarding the protection and use of plant material.
- Control hygiene and security in the workplace.
- Be aware of environmental aspects.
- Handle the reproductive system of plants (neuter, hybridise, etc.).
- Use the laboratory tools derived from new biotechnologies (different types of molecular markers, molecular hybridisations, digestions, etc.).
- Perform in vitro culture of plants and plant tissues (micropropagation, regeneration, anther and ovule culture, etc.).
- Use germplasm conservation techniques (preservation, cryopreservation, performing viability tests, etc.).
- Use laboratory techniques to improve quality and resistance to stress (analysing compounds of nutritional value, physiological features and pathogens, inoculating pathogens, handling organisms, etc.).
- Obtain transgenic plants.
- Carry out experimental designs in specific breeding programmes.
- Produce commercial plant material.
- Extract useful information from combined information sources.
- Prepare and write reports.

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## ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

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### UPC school

[Barcelona School of Agri-Food and Biosystems Engineering \(EEABB\)](#)

### Participating institutions

[Universitat Politècnica de Catalunya \(UPC\)](#)

[Universidad Politécnica de Madrid \(UPM\)](#)

[Universitat Politècnica de València \(UPV\)](#) - **coordinating** university

### Academic coordinator

[Francesc Casañas](#)

