



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2023/24
MASTER DEGREE
Crops and Plant Sciences (Classe LM-69)
Enrolled from 2019/20 academic year

HEADING

Degree classification - Denomination and code:	LM-69 Agriculture
Degree title:	Dottore Magistrale
Curricula currently available:	Crop Production / Plant Biotechnology
Length of course:	2 years
Credits required for admission:	180
Total number of credits required to complete programme:	120
Years of course currently available:	1st , 2nd
Access procedures:	Open, subject to entry requirements
Course code:	G59

PERSONS/ROLES

Head of Study Programme

Prof.ssa Laura Rossini

Tutors - Faculty

Tutor per i piani di studio:

lettera iniziale cognome studenti A-F: Prof.ssa Anna Spinardi

lettera iniziale cognome studenti G-M: Prof.ssa Gabriella De Lorenzis

lettera iniziale cognome studenti N-R: Prof.ssa Paola Casati

lettera iniziale cognome studenti S-Z: Prof.ssa Daniela Lupi

Degree Course website

<https://sppp.cdl.unimi.it/it>

Course management for the Faculty of Agricultural and Food Sciences (Science and Technology area)

via Celoria 2 - Milano Città Studi Phone 050316511-0250316512 Lunedì, mercoledì e venerdì dalle 10.30 alle 12.30; martedì e giovedì dalle 14 alle 16. <https://informastudenti.unimi.it/saw/ess?AUTH=SAML>

Degree programme head

Phone 0250316581 Email: didattica.disaa@unimi.it

Student registrar

via Celoria 18 - Milano Città Studi Phone 0250325032 <https://www.unimi.it/it/node/360> <https://www.unimi.it/it/node/359>

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

1. The master's degree course in Crops and Plant Sciences, belonging to the master's degree class in Agricultural Sciences and Technologies (Class LM-69). The aim of the master is to prepare graduates with a wide cultural background, scientific training with particular reference to the method; professional preparation in the areas of plant production, their protection, including ornamental and urban green systems, landscaping and environmental recovery / remediation, as well as in the protection of plants from adversity to obtain competitive and sustainable production. 2. The training received will give to the graduates an in-depth knowledge of current agricultural systems and greenery, with purposes that are both increase yield and protection of the territory and the environment. The degree course in Crops and Plant Sciences is characterized by a strong specialization in scientific and design aspects in the wide sector of cultivation systems, technical and recreational green areas, and the sustainability of production processes. 3. In particular, master's degrees will provide: • qualified skills to plan and manage research and innovative processes, both independently and in work groups, taking on project and structure responsibilities; • in-depth knowledge of the agricultural environment, and agro-ecosystems with their main guiding variables, such as climatic, agro-meteorological and pedological. • qualified knowledge of biology, physiology, genetics and molecular biology of plants and their pests and related interactions, essential for obtaining the quantitative-qualitative improvement of agricultural plant production, for rationally planning the defense and for safeguarding soil resources, using

traditional and innovative technologies; • acquired the methodologies, including laboratory, for the quality control of the supply chain of the various plant productions and will know how to design, manage and certify the systems and processes of plant production and plant protection; • skills to program and manage the strategies, technologies and means used in the production and defense of plants and to minimize the impact that the means themselves can have on the environment; • skills to be able to organize and manage scientific research plans in the public and private sector; • skills for managing traditional and innovative genetic improvement programs; • command of a European language, usually English.

Expected learning outcomes

Graduate will gain the ability to solve new problems not previously codified, also in the interdisciplinary and operational management of complex systems. In particular, the graduate will be able to independently design and manage farms, plan agricultural systems, and green systems on a territorial scale, obtain quality agricultural production according to specific characteristics required by users, set up business management programs and territorial oriented to the sustainability of agricultural activity also internationally.

Professional profile and employment opportunities

This professional figure will find employment, also with reference to the group "Agronomists and assimilated" of the ISTAT classification of professions (intellectual, scientific, and highly specialized professions, for which a high level of knowledge and experience is required; their tasks consist in enriching existing knowledge by promoting and conducting scientific research; in interpreting concepts, scientific theories and norms; in teaching them systematically; in applying them to the solution of concrete problems), in the following sectors: in the free profession, after passing the state exam, enrolling in the Register of Agronomy and Forestry Doctors; in public research bodies, as responsible for the qualitative and quantitative improvement of agricultural crops and their defense; in the regional phytosanitary services, as inspectors for goods in transit and for nurseries or as officials in charge of drafting the regional disease protection directives; in the industries producing technical means for agriculture (seeds, fertilizers, plant protection products, etc.), with research or consultancy tasks for operators; in large-scale organized distribution, as responsible for the planning of agricultural plant production, the drafting of production regulations and the control of the healthiness of food; in the design, management and defense of ornamental, recreational and sports green; in the development and organization of technical assistance services; in rural development projects, including on an international scale, by integrating productive, managerial, environmental enhancement, and sustainability of agricultural activities skills.

Initial knowledge required

Admission requirements

The programme is open, but a B1 level in English is required for admission to the first year, and B2 for the second year.

Graduates of class L-25 (Agricultural sciences and technologies), as well as the corresponding class pursuant to Ministerial Decree 509/99, may access the programme if they have earned at least 30 credits in the following academic fields: BIO/01 - General botany BIO/02 - Systematic botany BIO/03 - Environmental and applied botany BIO/04 - Plant physiology BIO/05 Zoology BIO/13 Applied biology CHIM/03 - General and inorganic chemistry CHIM/06 - Organic chemistry FIS/01 to FIS/07 MAT/01 to MAT/09 INF/01 Computer science ING-INF/05 - Data processing systems SECS-S/01 Statistics.

Graduates from classes other than class L-25, who have earned at least 60 credits in the following academic fields, may also access the programme:

AGR/01 - Economy and rural appraisal, AGR/02 - Agronomy and herbaceous crops, AGR/03 - General arboriculture, AGR/04 - Horticulture and floriculture, AGR/05 - Forest management and forestry, AGR/07 - Agricultural genetics, AGR/08 - Agricultural hydraulics, AGR/09 - Agricultural mechanics, AGR/10 - Rural constructions and agro-forestry territory, AGR/11 - General and applied entomology, AGR/12 - Plant pathology, AGR/13 - Agricultural chemistry, AGR/14 - Pedology, AGR/15 - Food science and technology, AGR/16 - Agricultural microbiology, BIO/07 - Ecology, BIO/18 - Genetics, BIO/19 - General microbiology, CHIM/01 - Analytical chemistry, CHIM/12 - Environmental and cultural heritage chemistry, GEO/02 - Stratigraphic and sedimentological geology, GEO/04 - Physical geography and geomorphology, GEO/06 - Mineralogy, GEO/07 - Petrology and petrography, ICAR/06 - Topography and cartography, ICAR/15 - Landscape architecture, IUS/03 - Agricultural law, IUS/14 - European Union law, SECS-P/08 - Economics and business management.

Proficiency in English at a B1 level or higher under the Common European Framework of Reference for Languages (CEFR) is required for admission.

The B1-level requirement will be ascertained by the University Language Centre (SLAM) upon admission as follows:

- Language certificate at or above B1, obtained no more than three years earlier. For the list of language certificates recognized by the University please review: <https://www.unimi.it/en/node/39267/>). The certificate must be uploaded when submitting the online application;
- English level achieved during a University of Milan degree programme and certified by the University Language Centre (SLAM) no more than four years before the date of admission application. In this case the process is automatic, the applicant does not have to attach any certificates to the application;
- Placement test administered by the University Language Centre (SLAM) according to the calendar published on the website: <https://www.unimi.it/en/node/39267/>

All those who fail to submit a valid certificate or do not meet the required proficiency level will be instructed during the admission procedure to take the placement test.

Applicants who do not take or pass the placement test will be required to obtain a language proficiency certificate recognized by the University (see: <https://www.unimi.it/en/node/297/>) and deliver it to the SLAM via the InformaStudenti

service by the deadline fixed for the master's programme (<https://www.unimi.it/en/node/39267/>).

Applicants who do not meet the requirement by said deadline will not be admitted to the master's degree programme and may not sit any further tests.

Admission assessment

During application assessment, an admission board will evaluate the curricular requirements of the candidates and, if necessary, may ask for further documents.

The board may also highlight any shortcomings to be filled before the admission interview that will be held on the following dates:

- 19 September 2023, 2.00 pm;

- 12 January 2024, 2.00 pm.

The interviews will take place via videoconference. Connection details will be notified to the candidates within one week of the interview date.

Compulsory attendance

Attendance is strongly recommended for all training activities.

Degree programme final exams

The programme culminates in the final exam, where students will be required to present and discuss a paper (thesis) written under the guidance of a supervisor. The paper requires in-depth scientific study of the subject matter. The workload must be in line with the number of credits (CFU) awarded for theses under the programme regulations, i.e. 42. The examining board will take into account the student's entire course of studies. The final paper may be written in Italian or in English. Given the importance of the final exam in the curriculum, students should start working on their thesis no later than the second semester of Year I.

Notes

In order to register for exams included in the second year study plan, students must be proficient in English at a B2 level. This proficiency level may be certified as follows:

- By submitting a language certificate attesting B2 or higher level in English and issued no more than three years before the date of submission. You will find the list of language certificates recognized by the University at: <https://www.unimi.it/en/node/297/>. The certificate must be uploaded during the enrolment procedure, or subsequently to the portal <http://studente.unimi.it/uploadCertificazioniLingue>;

- B2 or higher level achieved during a University of Milan degree programme and certified by the University Language Centre (SLAM) no more than four years before the date of admission application. In this case the process is automatic, the applicant does not have to attach any certificates to the application

- Through a placement test administered by the SLAM between October and January of year 1. Applicants who fail the test will be required to take a SLAM course.

The placement test is mandatory for all those who do not hold a valid certificate.

Those who do not take the placement test by January or do not pass the end-of-course exam after six attempts must obtain the necessary certification privately.

EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment. The agreements entered into by the University with over 300 universities from the 27 EU member countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

The Course of study in Crops and Plant Sciences gives many opportunities for stages abroad mainly through the Erasmus+ programme. About 30 foreign Universities of the EU are involved in this students exchange. The areas of study which can be followed by the students abroad are almost all those included in this course of study. In general, students who make a stage abroad attend local courses or participate in research for the preparation of their thesis. The examination scores and the related UFC obtained in the partner universities are almost entirely acknowledged by our university for the curriculum studies. Other possibilities exist in terms of cultural exchange with non EU universities (in China, Japan, Latin America) not involved in the Erasmus programme. The Master degree in Crop and Plant Science is partner of the double degree in the framework of Erasmus Mundus Master Program in Plant Breeding – emPlant+ (EMJMD) and Tokyo University of Agriculture and Technology. Informations at <https://www.unimi.it/en/international/study-abroad/double-degree>.

How to participate in Erasmus mobility programs

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.

Ad hoc commissions will evaluate:

- Academic career
- the candidate's proposed study programme abroad
- his/her foreign language proficiency
- the reasons behind his/her application

Call for applications and informative meetings

The public selection for Erasmus+ mobility for study generally begins around February each year with the publication of a call for applications specifying destinations and requirements. Regarding the Erasmus+ Mobility for Traineeship, the University of Milan usually publishes two calls a year enabling students to choose a destination defined by an inter-institutional agreement or to find a traineeship position on their own.

The University organizes informative meetings to illustrate mobility opportunities and rules for participation.

Erasmus+ scholarship

The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which may be supplemented by the University funding for disadvantaged students.

Language courses

Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University Language Centre (SLAM).

<https://www.unimi.it/en/node/8/>

Learn more at <https://www.unimi.it/en/node/274/>

For assistance, please contact:

International Mobility Office

Via Santa Sofia 9 (second floor)

Tel. 02 503 13501-12589-13495-13502

Contacts: InformaStudenti; mobility.out@unimi.it

Student Desk booking through InformaStudenti

1st COURSE YEAR Core/compulsory courses/activities common to all curricula		
Learning activity	Ects	Sector
English proficiency B2 (3 ECTS)	3	ND
Herbaceous cropping systems	6	AGR/02
Microbial biotechnologies applied to plant production	6	AGR/16
Physiology of plant production	6	AGR/13
Plant protection management	6	AGR/12
Tree growing strategies	6	AGR/03
Virology and physiopathological biotechnologies	6	AGR/12
Total compulsory credits	39	
COURSE YEAR UNDEFINED Core/compulsory courses/activities common to all curricula		
Learning activity	Ects	Sector
Other useful knowledge for entering the world of work	3	NA
Total compulsory credits	3	
Further elective courses common to all curricula		
<p>The academic plan includes 12 credits for elective activities. To this end, students can select courses organised for this and other degree programmes of this Faculty and the University in general, or opt for other educational activities that can be measured in credits. These can be seminars, conferences, refresher courses and other activities organised by this University or another entity, provided that they are congruent with the study programme. Normally, a maximum of 4 credits can be awarded for this kind of activities, which must be approved beforehand by the Academic Board. For information on how to obtain credits for such activities, students have to contact their tutor. For students pursuing a Master's degree in Crops and Plant Sciences, the Academic Board notably recommends the elective courses specified in the table below. The programme offers two alternative curricula. Therefore, students may select as elective activities courses included in the curriculum that they have not chosen. The following courses are particularly recommended to students who have opted for the Plant Biotechnology curriculum:</p> <p>- Basic statistics and experimental design</p> <p>- Plant breeding</p>		
Bioinformatics for horticultural sciences	6	AGR/03
Design and management of irrigation systems	4	AGR/08
International agri-food markets and policy	7	AGR/01
Marketing to breeding	6	AGR/01
Pest management in post-harvest food	6	AGR/11
Planning and realization of urban green spaces	6	AGR/03
Proximal sensing and data analysis for agricultural products	6	AGR/09
Ree Biocontrol of pathogens - Innovative, low environmental impact approaches for the control of pathogens (BASIC)	3	AGR/12

Ree Crispres - A workshop on genome editing technologies	3	AGR/07, BIO/01, AGR/12, AGR/03
Ree Fru-Bqe - FRUit Breeding and Quality evaluation Experience	3	AGR/09, AGR/03
Tree propagation and nursery industry	6	AGR/03
Woody plant biotechnology	6	AGR/03
End of course requirements common to all curricula		
Final exam	42	NA
Total compulsory credits	42	

ACTIVE CURRICULA LIST

Crop Production Course years currently available: 1st , 2nd
Plant Biotechnology Course years currently available: 1st , 2nd

CURRICULUM: [G59-C] Crop Production

Qualifying Training Objectives

Learning objectives for this curriculum focus on agronomic experimentation planning and statistical data processing. Students can major in the management of greenhouse farming systems, plant genetic improvement and applied entomological sciences.

Skills acquired

Students will learn how to manage complex cultivation systems in the open field and in greenhouses. They will have the skills to organize and manage agronomic comparison tests and to evaluate their results with scientific rigor through the application of static methods. They will be able to manage and follow classical and modern genetic improvement programmes. Finally, they will have the skills to use innovative tools in pest control.

Professional profile and employment possibilities

Graduates may work as agronomists in agricultural companies with multiple production lines, in technical equipment industries. They can manage comparison tests and conduct research in public and private centres, work in greenhouses and vertical farms. They may also work in the genetic improvement and seed production industry.

2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Crop Production		
Learning activity	Ects	Sector
Applied entomology	6	AGR/11
Basic statistics and experimental design	6	AGR/02
Plant breeding	6	AGR/07
Protected cultivation systems	6	AGR/04
Total compulsory credits	24	

CURRICULUM: [G59-D] Plant Biotechnology

Qualifying Training Objectives

Learning objectives for this curriculum focus on the basics of plant molecular biology and molecular approaches to genetic improvement and crop protection. Students will learn the fundamentals of crop ideotypes development with a view to increasing yield and quality.

Skills acquired

Students will learn specific skills in the field of molecular biology applied to biotechnological genetic improvement, molecular disease diagnosis, control and prevention.

Professional profile and employment possibilities

Graduates will be able to work in research and experimentation companies in the field of biotechnological genetic improvement, biocontrol and crop protection.

2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Plant Biotechnology		
Learning activity	Ects	Sector
Advanced plant pathology	6	AGR/12
Development of crop ideotypes	6	AGR/07
Molecular methods for plant breeding	6	AGR/07
Plant molecular biology	6	AGR/07
Total compulsory credits	24	