UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2026/27
MASTER DEGREE
CROPS AND PLANT SCIENCES (Classe LM-69 R)
Enrolled in the 2025/26 academic year

HEADING

Degree classification - Denomination and code:	LM-69 R
Degree title:	Dottore Magistrale
Curricula currently available:	
Length of course:	2 years
Credits required for admission:	180
Total number of credits required to complete programme:	120
Years of course currently available:	2nd
Access procedures:	
Course code:	GBA

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 Silvia Laura Toffolatti
lettera iniziale cognome studenti G-M: Prof.ssa Gabriella Consonni
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)

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Student registrar

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CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The Master's Degree Course in Crop and Plant Sciences, part of the Master's Degree class in Agricultural Sciences and Technologies, aims to prepare graduates with a broad cultural and scientific education, providing specific and qualified skills to plan and manage research and innovative processes, either independently or in teams, assuming project and structural responsibilities in public or private companies. The program aims to provide professional training in the fields of plant production and ornamental and urban green systems, as well as plant protection from abiotic and biotic stress, to achieve competitive and sustainable productions.

The training received will give graduates an in-depth knowledge of current agricultural/cropping systems and technical and recreational green spaces, aiming to improve plant production, while also protecting the environment and adapting to its changing conditions.

The degree program will provide specific and qualified knowledge of plant biology, physiology, genetics, and molecular biology, as well as the biology of microorganisms and parasites and their interactions, as essential foundations for improving the quantitative and qualitative aspects of agricultural plant production, rationalizing plant protection strategies, and conserving resources by utilizing both traditional and innovative technologies, including genetic improvement programs. Students will acquire methodologies, including laboratory techniques, to control the quality and sustainability of plant

production and to design, manage, and certify production systems and processes.
In order to ensure high-level scientific and professional competencies, the Master's Degree Course in Crop and Plant Sciences is designed to provide graduates with a broad spectrum of knowledge and skills necessary for analyzing and solving problems using a scientific and multidisciplinary approach.
After a common first year, the degree program offers the possibility to choose between two curricula, delivered in English in the second year. The first curriculum, focused on plant biotechnology, allows for greater specialization in biotechnological and genomic approaches to understand plant production and protection mechanisms and apply them to genetic improvement. The second curriculum provides advanced training on approaches and methodologies to be applied in cultivation systems to optimize production inputs in interaction with the environment.

Expected learning outcomes

Knowledge and Understanding
Graduates will develop an understanding of the agricultural system that will enable them to formulate and apply original ideas, including in research contexts. Specifically, graduates will have:
? A strong cultural background and an excellent command of the scientific method of investigation;
? In-depth knowledge of agricultural environments and agroecosystems, including their key driving variables;
? Specific and qualified knowledge of the biology, physiology, genetics and molecular biology of plants and their parasites, essential for improving plant production, planning protection strategies, and conserving resources through traditional and innovative technologies;
? Knowledge of laboratory techniques for quality control and sustainability assessment in plant production and the design, management, and certification of plant production and protection systems;
? A comprehensive understanding of production processes, pests, and the damages they cause to agricultural plant production.
Knowledge and understanding will be acquired through lectures, exercises, independent study of advanced texts and scientific publications, and group activities. Verification of the expected outcomes will be assessed through oral, written, and/or practical exams.

Applying Knowledge and Understanding
Graduates will acquire problem-solving skills for novel and unprecedented challenges, even in interdisciplinary fields, and operational management of complex systems. Specifically, graduates will be able to:
? Plan agricultural and green systems, ensuring high-quality agricultural production that meets specific user demands and aligns with sustainability and environmental protection goals, also at an international level;
? Plan and manage research and development activities independently or within teams, assuming project and structural responsibilities;
? Manage herbaceous and arboreal cropping systems in both protected and open-field environments, ensuring their protection;
? Apply biotechnological, genomic, and molecular biology methods for genetic improvement and crop protection within public and private research sectors;
? Plan experiments, manage, process, analyze, and interpret complex data relevant to the study program.
Knowledge application will be developed through practical exercises within individual courses and experimental research activities for the Master?s thesis, conducted under the supervision of a faculty member.

Making Judgements
Graduates will develop independent judgement skills for evaluating and interpreting technical, experimental, and scientific data, as well as for environmental assessment of agricultural management projects, even of high complexity. They will also acquire comprehensive abilities for the evaluation and implementation of innovative technical itineraries to achieve high-quality productions with user-defined characteristics. Furthermore, graduates will be capable of planning and managing research and development projects in the field of plant production.
Independent judgement will be developed through in-depth application of the scientific method, via practical and project-based activities, both individually and in groups, within specific courses and research activities for the preparation of the experimental thesis.
The assessment of independent judgement skills will take place through oral and/or written exams, as well as through group work in laboratory or field exercises. Additionally, group-based project activities within the curriculum will allow for the evaluation of students? autonomous decision-making skills.

Communication Skills
Graduates will acquire appropriate knowledge and tools, including IT and bioinformatics skills, for technical and scientific communication, for processing and discussing experimental data, and for teamwork. They will be able to structure their communications effectively and present the characteristics and implications of their choices and project activities in a comprehensive and integrated manner. Furthermore, they will be fluent in both written and spoken English in addition to Italian, including discipline-specific terminology for the same types of communication.
These skills will be acquired through individual and group activities during the study program, as well as through the preparation of presentations within individual courses or specific projects. The acquisition of such abilities will be assessed through exams and the final presentation during the defense of the experimental thesis.

Learning Skills

Graduates will possess all necessary tools to keep themselves updated about the latest knowledge advances within their specific professional sector and in scientific research. They will also have the necessary background to potentially pursue third-level studies.

Learning and updating skills will be developed within individual courses through project-based activities and journal clubs, where students will acquire the ability to explore and consult scientific bibliographic resources and databases. Within the research activity for the experimental thesis, students will also gain the ability to learn and refine investigative methodologies through critical analysis of their own results.

The assessment of learning skills will mainly take place through written and/or oral exams. Additionally, the way students carry out experimental activities for the final thesis preparation may contribute to the evaluation of these competencies.

Professional profile and employment opportunities

Technical Developers for Plant Production and Green Systems

Role: Professionals in this category are involved in developing innovative tools and processes for agroecosystem management.

Skills: In-depth knowledge of agroecosystems in terms of productivity and environmental compatibility.

Employment Opportunities: Research and advanced technical consulting in private companies producing seeds, plant materials, pesticides, fertilizers, and controlled-environment cultivation solutions; National and international organizations in research and innovation sectors.

Breeders

Role: Professionals in this sector focus on genetic improvement, conservation, and valorization of plant genetic resources.

Skills: Graduates will have knowledge of classical and biotechnological genetic improvement methods, in situ and ex situ plant material conservation, and the ability to manage experimental plans to evaluate and compare materials for potential varietal registration.

Employment Opportunities: Seed companies developing breeding programs; Public and private research institutions developing and evaluating new cultivars; Molecular biology laboratories for traceability analysis; National and international organizations involved in development cooperation, particularly germplasm banks for biodiversity preservation and food security.

Phytopathologists/Entomologists

Role: Professionals in this field design and develop diagnostic protocols and pest control models, applying EU legislation on environmental sustainability.

Skills: Graduates will have knowledge of common and emerging plant pathogens and pests, understanding their economic impact and the essential prevention strategies for environmental protection.

Employment Opportunities: Research positions in public and private institutions developing modern diagnostic tools; Companies producing low-impact phytosanitary products; National and international organizations involved in development cooperation.

The Master Degree Course provides access to the state exam for obtaining the habilitation for the following profession
Agronomy and forestry doctor

Initial knowledge required

Admission requirements

Access is free but a B1 knowledge of the English language is required for admission to the first year.

In order to take the second year exams, a B2 knowledge of the English language is required.

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.

During the application verification phase, an examination committee will evaluate the candidates' curricular requirements and, if necessary, may request an integration of the documentation produced. It may also report any disciplinary gaps that candidates will have to fill before the interview to verify the adequacy of the initial preparation.

A maximum of 24 credits can be recognised (according to DM 931/2024) based on certified professional knowledge and skills, as well as other knowledge and skills acquired from post-secondary training activities planned and organized with the contribution of the University.

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, including levels based on language certificates submitted by the applicants during their Bachelor's degree at the University of Milan. In this case the process is automatic, the applicant does not have to attach any certificates to the application;
- Entry test administrated 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 Entry test.
Applicants who do not take or pass the Entry test will be required to obtain a language proficiency certificate recognized by the University (see: https://www.unimi.it/en/node/39322) 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.

The admission notice is published on the page https://sppp.cdl.unimi.it/en/enrolment

Admission assessment
Candidates who have satisfied the curricular entry requirements will have to undergo an interview to verify the adequacy of their personal preparation, which will be held on the dates indicated:
- September 18, 2025, 2.00 pm;
- January 7, 2026, 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

In the final exam, which constitutes an individual learning experience completing the course, students, under the guidance of a supervisor, must present a thesis that will be illustrated and discussed. The thesis must provide a thorough scientific study of the topic addressed and its preparation must be commensurate with the number of credits assigned to it by the University regulations, which is 30. The committee responsible for evaluating the final exam will express a judgment that takes into account the student's entire study path. The thesis may be written in Italian or English, and its defense may be conducted in English.

Notes

knowledge of the English Language

To be able to take the second year exams, students must be proficient in English at a B2 level, certified as follows:
By summitting a valid language certificate at B2 level or higher, issued no more than three years prior to the application date. The list of language certificates recognized by the University is available at https://www.unimi.it/en/node/39322. If not submitted during the application process, the certificate must be uploaded when enrolling, or later through the portal: http://studente.unimi.it/uploadCertificazioniLingue;
- B2 level or higher achieved earlier and validated during the application process;
- B2 level or higher achieved during the Entry test;
- By taking a Placement test administered by the University Language Centre (SLAM) between October and January of year 1.
Students who do not meet the B2 requirement will be required to attend a B2-level English course offered by the University Language Centre (SLAM) during the second semester of the first year.
Those who do not attend the course or fail the end-of-course test after six attempts must obtain a language certificate privately before graduating.

Italian language assessment with MANDATORY credits A2

To obtain the degree, those who do not hold an Italian high school diploma or degree must demonstrate proficiency in Italian

at the A2 or higher level per the Common European Framework of Reference for Languages (CEFR). This level must be demonstrated prior to completing the course programme in one of the following ways:
- by submitting a certificate of A2 or higher level issued no more than three years prior to the date of submission. You will find the list of language certificates recognized by the University at: https://www.unimi.it/en/node/349/). The language certificate must be uploaded through http://studente.unimi.it/uploadCertificazioniLingue ;
- via an entry-level test administrated by SLAM that can be taken only once and is compulsory for all students who do not have a valid language certificate. Those who fail to reach A2 level will have to attend one or more than one 60-hour Italian course(s) geared to their level. Those who do not take the entry-level test or fail to pass the end-of-course test after six attempts will have to obtain language certification privately in order to earn the 3 credits of Additional language skills: Italian.

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 organisations.
Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.
The University of Milan is a member of the 4EU+ European University Alliance that brings together eight public multidisciplinary universities: University of Milan, Charles University of Prague, Heidelberg University, Paris-Panthéon-Assas University, Sorbonne University of Paris, University of Copenhagen, University of Geneva, and University of Warsaw. The 4EU+ Alliance offers integrated educational pathways and programmes to promote the international mobility of students (physical, blended and virtual).

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 organises 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;
Student Desk booking through InformaStudenti

1st COURSE YEAR (disactivated from academic year 2026/27) Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
English proficiency B2 (3 ECTS)		3	NN
Herbaceous Cropping Systems		6	AGR/02
Microbial Biotechnologies Applied to Plant Production		6	AGR/16
Physiology of Plant Production		6	AGR/13
Prevention and Control of Plant Pests and Pathogens		12	(6) AGR/11, (6) AGR/12
Tree Growing Strategies		6	AGR/03
Virology and Physiopathological Biotechnologies Biotechnologies		6	AGR/12
	Total compulsory credits	45	

Elective courses common to all curricula

STUDENTS MUST ACQUIRE 3 ADDITIONAL CREDITS

For Italian students, a theoretical-practical course is planned relating to the topics covered in the study program, held by freelancers or experts in some production sectors and professors related to the degree program to illustrate and discuss topics useful for entering the world of work (Other knowledge useful for entering the world of work).

For foreign students, an assessment of knowledge of the Italian language is planned (see the paragraph Language tests).

Additional Language Skills: Italian (3 ECTS) *Compulsory for foreign students*	3	NN
Other useful knowledge for entering the job market	3	NN

2nd COURSE YEAR Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
Statistics and experimental design		6	AGR/02
	Total compulsory credits	6	

Further elective courses common to all curricula

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. See also the paragraph Structure of the course - Presentation of the study plan. 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. The programme offers two alternative curricula. Therefore, students may select as elective activities courses included in the curriculum that they have not chosen. Furthermore, for students following the Master's Degree Course in Crop and Plant Sciences, the Academic Board notably recommends the elective courses indicated in the table below.

Bioinformatics for horticultural sciences	6	AGR/03
Low Environmental Impact Techniques and Methodologies for the Control of Plant Diseases	6	AGR/12
Marketing to breeding *Not activated for 2026/2027 a.y.*	6	AGR/01
Nursery tree production	6	AGR/03
Pest Management in Post-Harvest Food	6	AGR/11
Planning and Realization of Urban Green Spaces	6	AGR/03
Plant phenotyping methods (P2M)	6	AGR/03
Proximal sensing and data analysis for agricultural products *Not activated for 2026/2027 a.y.*	6	AGR/09
Ree Fru-Bqe - Fruit Breeding and Quality Evaluation Experience	3	(1) AGR/09, (2) AGR/03

End of course requirements common to all curricula

Final Exam		30	NN
	Total compulsory credits	30	

ACTIVE CURRICULA LIST

CROP PRODUCTION Course years currently available: 2nd
PLANT BIOTECHNOLOGY Course years currently available: 2nd

CURRICULUM: [GBA-A] CROP PRODUCTION

Qualifying Training Objectives

The Crop Production curriculum aims to provide in-depth knowledge of approaches and methodologies applied to cultivation systems for optimizing production inputs, considering soil and climatic conditions as well as abiotic and biotic stresses. This curriculum offers a multidisciplinary specialization in crop system management, from genetic improvement to sustainability evaluation in open-field and protected environments.

Skills acquired

Students enrolled in the Crop Production curriculum will develop the skills necessary for managing complex crop systems in both open-field and protected environments. They will gain expertise in analyzing soil-plant-atmosphere system processes using modeling approaches and quantifying production responses to agronomic management in environmental interactions. Graduates will be able to manage and implement both classical and modern genetic improvement programs. Additionally, they will acquire competencies in the critical application of software tools for environmental sustainability assessment, quantifying carbon and water footprints. Lastly, they will be equipped to design, manage, and optimize cultivation systems in controlled environments.

Professional profile and employment possibilities

The Crop Production curriculum provides skills for careers as agronomists in agricultural enterprises with diverse production activities and in industries specializing in technical production means. Graduates can oversee comparative trials and conduct research in both public and private centers. They may also find employment in greenhouse production and vertical farming, utilizing agronomic and genetic expertise along with advanced software for data analysis and resource-use efficiency assessment. Additionally, graduates will have career opportunities in companies engaged in genetic improvement and seed production.

2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features CROP PRODUCTION

Learning activity		Ects	Sector
Crop modeling		6	AGR/02
Methodologies for quantifying the environmental sustainability of crop production		6	AGR/09
Plant breeding		6	AGR/07
Protected cultivation systems		6	AGR/04
	Total compulsory credits	24	

CURRICULUM: [GBA-B] PLANT BIOTECHNOLOGY

Qualifying Training Objectives

The Plant Biotechnology curriculum aims to provide students with a foundation in plant molecular biology and the molecular methods applicable to genetic improvement and crop protection. The curriculum will cover the development of crop ideotypes to enhance productivity and production quality.

Skills acquired

Students enrolled in the Plant Biotechnology curriculum will acquire specialized skills in molecular biology applied to genetic improvement through genomic and biotechnological approaches, as well as competencies in molecular diagnostics of pathogens, their control, and prevention.

Professional profile and employment possibilities

The Plant Biotechnology curriculum provides expertise for careers in research and experimentation in companies engaged in genetic improvement using biotechnological methodologies. Graduates may also find employment in companies developing biocontrol products for 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	