



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2022/23
MASTER DEGREE
Agricultural 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:	
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:	Open, subject to entry requirements
Course code:	G58

PERSONS/ROLES

Head of Study Programme

Prof. Roberto Oberti

Tutors - Faculty

Tutor per i piani di studio:

lettera iniziale cognome studenti A-B: Prof.ssa Luisa Maria Pellegrino

lettera iniziale cognome studenti C: Prof. Pietro Marino Gallina

lettera iniziale cognome studenti D-E-F: Prof.ssa Alessia Perego

lettera iniziale cognome studenti G-H-I-K-L: Prof.ssa Noemi Negrini

lettera iniziale cognome studenti M-N: Prof. Roberto Pretolani

lettera iniziale cognome studenti O-P: Prof. Aldo Calcante

lettera iniziale cognome studenti Q-R: Prof.ssa Arianna Facchi

lettera iniziale cognome studenti S-T: Prof. Salvatore Roberto Pilu

lettera iniziale cognome studenti U-V-Z: Prof. Luca Rapetti

Degree Course website

<https://scienzeagricarie-lm.cdl.unimi.it/>

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

via Celoria 2 - Milano Città Studi Phone 0250316511-0250316512 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 0250316867 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

The master degree in Agricultural Sciences, which belongs to the class L-69 "Agricultural Sciences and Technologies", aims at training master graduates with a high skills based on the most recent and advanced knowledge in the different agrarian sectors. The skills acquired will permit the graduate to realize the importance of a modern agriculture and of its role of combining the traditional mission of supplying food, with that of safeguarding the territory and producing safe and sustainable food. The master graduate will have the cultural, scientific and technical flexibility, gained through a multi-disciplinary/integrated approach to the different aspects, necessary to check and manage the ongoing adaptation of the agricultural productive system to the new needs of the complex and heterogeneous European society.

Considering the actual evolution of the most advanced agricultural areas in Italy and in Europe, the learning structure of the degree course is focused on three specific educational areas: 1) farm management and its links with the market, the

production chains, and the territory and the environment involved; 2) livestock production, the livestock chains and the related relations with the environment sustainability and the food safety; 3) precision farming systems and methods and management of the digital technologies associated.

Common learning objectives of the master degree are a deepening of the skills and knowledge on agriculture and its management both at farm and at territory level, and the acquisition of the ability of planning, implementing and manage the production processes and the technical innovations in a view of a safeguard of the environment and the territory.

Expected learning outcomes

Master graduates in Agricultural Sciences will be able to plan, manage and audit environmentally friendly agricultural systems and processes; particularly, the environmental sustainability will take into account soil defense and protection by means of traditional and innovative technologies. The graduate will have the skill to: use the techniques (also the lab ones) to check the quality of the different crop-livestock production chains; plan and manage the technical innovations of the agricultural productions, with particular reference to the most suitable instrument for the defense, the conservation and the management of the different commodities and their marketing; utilize the tools for an economic evaluation of the enterprise competitiveness, the choices in agricultural policy and rural appraisals; utilize the informatics technologies for monitoring and modelling, also in view of implementing development projects; work in autonomy, with projects and structure change; fluent written and oral use of a European language, besides Italian, with a knowledge of the specific agriculture technical words.

Professional profile and employment opportunities

The profile of the master graduate in Agricultural Sciences is an upgrade of that acquainted by the bachelor graduate in Agricultural Sciences and Technologies. He/she will be able to perform all the activities foreseen by the Professional Register of the Agronomists. The knowledge and the skills provided will enable the graduate in Agricultural Sciences to work, at planning and direction level, in the following sectors: crop-livestock productions, organization of the extension services, public and private administration, research and teaching; farm economic and administrative direction; integrated rural development projects; planning livestock structures/buildings; monitoring and safeguard of the rural territory; choice and set up of technical production plants; machine, plant and structure check and safety; planning agriculture mechanization and water management activities in the territory energy management in renewable energy systems; practices for environmental protection and sustainable agriculture; commercialization and marketing of agriculture commodities.

Particularly, the master graduate will have the following job opportunities, depending on the curriculum chosen within the degree course

Management – Managerial functions of direction and coordination: in farms and agricultural enterprises; in the agricultural sector of public institutions; in technical and commercial agricultural extension services. Moreover: private counselling in agricultural sectors.

Livestock systems - Managerial functions of direction and coordination: in livestock farms and agricultural enterprises linked to the livestock sector; in the livestock sector of public institutions; in technical and commercial livestock extension services. Moreover: private counselling in livestock sectors; research and development in private enterprises and research centres.

Precision farming – technical/professional services to support agricultural production; ICT (Information and communications technology) enterprises for agriculture (informatics, modelling, remote sensing, etc.); high innovation start-up for the agro-food sys; industry of agriculture precision technologies and farm machineries; technical and commercial support to farm adopting PF systems.

Initial knowledge required

Admission requirements

Graduates in class L-25 (Agricultural sciences and technologies), as well as in 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:

FIS/01 to FIS/07

MAT/01 to MAT/09

INF/01 - Computer science

SECS-S/01 - Statistics

CHIM/03 - General and inorganic chemistry

CHIM/06 - Organic chemistry

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

Graduates from classes other than class L-25, who, in addition to 30 credits in the aforementioned academic fields, 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/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/15 - Food science and technology
AGR/16 - Agricultural microbiology
AGR/17 - General zootechnics and genetic improvement
AGR/18 - Animal nutrition and feeding
AGR/19 - Special zootechnics
AGR/20 - Zooculture
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
VET/01 - Anatomy of domestic animals
VET/02 - Veterinary physiology

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 3 years prior to submission (for the list of language certificates recognized by the University please refer to the website: <https://www.unimi.it/en/study/language-proficiency/placement-tests-and-english-courses/english-entry-tests>). The certificate must be uploaded when submitting the online application;
- English level achieved during a Bachelor's degree programme through SLAM courses and tests. The test must have been passed within the last four years. Our offices will perform an internal check, without the applicant having to attach any statements;
- Placement test, delivered by SLAM.

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

Candidates who do not sit or pass the placement test will have until 31 December to obtain and submit a recognized certificate to SLAM.

Students who do not meet the requirement by 31 December will not be admitted to the Master's degree programme and may not sit 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. The interviews will take place via videoconference. Connection details will be notified to the candidates within one week of the interview date.

THE PROGRAMME WILL BE GRADUALLY TERMINATED STARTING FROM THE ACADEMIC YEAR 2022/23

Compulsory attendance

Course attendance is strongly recommended.

Degree programme final exams

Upcoming graduates must pass a final exam by presenting and defending an original paper written by the student under the guidance of a supervisor and possibly a co-supervisor. The Master's degree thesis is an essay structured as a scientific publication. For students to be admitted to the final exam, they must have completed their thesis and earned 98 credits, including 3 credits for "Additional skills". Moreover, they must prove English language proficiency at a B2 level or higher under the Common European Framework of Reference for Languages (CEFR).

Notes

In order to obtain their degree, students must be proficient in English at a B2 level. This proficiency level may be certified as follows:

- Through a language certificate at a B2 level or higher, as submitted during the admission procedure;
- Through the entrance test (B2 level or higher);
- Through a Placement Test, which is delivered by the University Language Centre (SLAM) during year I only, from October to January (B2 or higher).

All students who do not have a B2 level or higher will be required to attend a B2-level English course, which will be delivered by the University Language Centre (SLAM), in the second semester of year I only.

Those who do not attend the course or do not pass the end-of-course test within six attempts must obtain a paid language certificate by graduation.

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 Agricultural 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 learning agreement is outlined in collaboration with the person in charge for the Erasmus of the degree program, as regards both the choice of courses and the organization of the internship at the partner university. Students must obtain the formal approval of the examinations that they intend to carry out at the host university from professors who hold equivalent or similar teachings at the University of Milan before completing the learning agreement. As regards experimental activities abroad, which can constitute part or the entire program of the internship, a letter of agreement from a professor of the partner university is required, along with the formal approval on the objectives, on the program and on the term of the internship by a professor of the degree program, who will also act as supervisor. Other possibilities exist in terms of cultural exchange with non EU universities (in China, Japan, Latin America) not involved in the Erasmus programme.

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 (disactivated from academic year 2022/23) Core/compulsory courses/activities common to all curricula

Learning activity	Ects	Sector
Agricultural policy and rural appraisal	14	AGR/01
Cropping systems	8	AGR/02
English proficiency B2 (3 ECTS)	3	ND
Experimental methodologies in agriculture	6	AGR/17
	Total compulsory credits	31
Further elective courses common to all curricula		
Advanced dairy technologies	6	AGR/15
Agri-food Marketing	6	AGR/01
Economics of innovation in agriculture	6	AGR/01
Economics of natural resources	6	AGR/01
Energy for Agriculture	6	AGR/09
Field applications of precision agriculture	8	AGR/09, AGR/12
GIS (Geographical Information System) for rural landscape	6	AGR/10
International cooperation and crop-livestock systems	6	AGR/18
Plant disease and pest management	6	AGR/11, AGR/12
Plant protection management	6	AGR/12
Precision irrigation	5	AGR/08
Precision livestock feeding	6	AGR/18
Production and quality of fish products	6	AGR/20
Production, reproduction and animal health: monitoring and management	6	AGR/19
Protected cultivation systems	6	AGR/04
Sensors and automation for precision livestock	6	AGR/09
Simulation modelling for precision agriculture	5	AGR/02
Soil bioengineering	6	AGR/08
Tree growing strategies	6	AGR/03
Animal morphology and physiology (upgrade)	4	VET/01
Cytogenetic of livestock	4	AGR/17
Environmental impact of agro-food production systems	4	AGR/19, AGR/09
Marketing to breeding	6	AGR/01
Multimedia communication laboratory in agriculture	4	AGR/19, AGR/03
Planning and realization of urban green spaces	6	AGR/03
Precision dairy farming	3	AGR/19
Quality and genuineness of milk and dairy products <i>Not activated in the 2022/2023 academic year</i>	6	AGR/15
Ree RuMeN - Precision Feeding for the Environment: Rumen, Methane, and Nutrition	3	AGR/18
Tree propagation and nursery industry	6	AGR/03
End of course requirements common to all curricula		
Final exam	22	NA
	Total compulsory credits	22

ACTIVE CURRICULA LIST

Management Course years currently available: 2nd
Livestock systems Course years currently available: 2nd
Precision farming Course years currently available: 2nd

CURRICULUM: [G58-E] Management

Qualifying Training Objectives

Learning objectives for this curriculum focus on technical, production, and administrative criteria and approaches for optimal agribusiness management, market relations, processing and distribution chains, the environment and the local area. Students will learn how to: plan, coordinate and manage production processes; operate throughout value chains; provide farms with goods, services and technologies for business process optimization and innovation with a view to financial and environmental viability.

Skills acquired

Students will master technical and managerial aspects of agribusinesses and their interconnections with the manufacturing sector, the environment, the local area and society. More specifically, they will understand technical and scientific fundamentals and will be able to use technologies and analysis tools for:

- managing agricultural systems and maximizing crop quality and yield, adjusting technical approaches to specific production and market needs;
- planning a rational and sustainable use of inputs, water and natural resources, according to specific business and production needs;
- choosing and optimizing the use of suitable machinery and systems for different business models, field and stable production, handling, storage, and upstream processing;
- assessing and managing finance and administration, understanding market dynamics, agri-food policy, and its impact on trade and value chains;
- applying the criteria of traditional and innovative valuation to the appraisal of farmland on a micro and macro scale;
- applying survey and digital cartography techniques, as well as approaches for business plant and facility planning, hydraulic works.

Professional profile and employment possibilities

Graduates may work in management, coordination, planning and operating positions in:

- technical, financial and administrative management of agricultural and livestock farms;
- organization and distribution of technical and field services to farmers and breeders;
- agricultural technology and machinery companies;
- agri-food chains, from processing to distribution and marketing of produce and meat and dairy products;
- organization and control of production protocols and value chain quality assurance;
- design and supervision of service facilities, warehouse, storage and technological systems of agricultural and livestock farms;
- professional practices and administrative, legal, technical and financial consultancy firms working with agricultural and livestock farms;
- technical departments of the public administration and managers of agricultural and water resources, land and green areas.

1st COURSE YEAR (disactivated from academic year 2022/23) Core/compulsory courses/activities Curriculum-specific features Management		
Learning activity	Ects	Sector
Hydrology and water management for agriculture	8	AGR/08
Landscape planning	8	AGR/10
Livestock, environment and food safety	8	AGR/19, AGR/18
Mechanization of agricultural processes	8	AGR/09
	Total compulsory credits	32
2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Management		
Learning activity	Ects	Sector
Economics of agricultural markets	8	AGR/01
	Total compulsory credits	8

CURRICULUM: [G58-F] Livestock systems

Qualifying Training Objectives

Learning objectives for this curriculum specifically focus on animal breeding techniques and technologies, the quality of livestock farming, value chains, the impact of land management practices on the environment and food safety. Graduates will be able to coordinate and lead livestock activities, as well as performing technical and design functions in both processing and distribution, in industries and companies providing goods and services to livestock farms.

Skills acquired

Students will hone their understanding of technical and managerial aspects of livestock and fodder systems, with a focus on environmental sustainability, food quality and safety, animal well-being and work safety. More specifically, they will understand technical and scientific fundamentals and will be able to use technologies and analysis tools for:

- planning and managing livestock production processes in order to maximize quality and yield;
- applying environmental impact assessment methods and choosing mitigation techniques for sustainable animal breeding;
- assessing design and functional aspects of livestock production plants and buildings, integrating regulatory and environmental dimensions with animal well-being;
- selecting and identifying fodder collection and animal feeding sites;
- managing and directing animal feed formulation and production processes with a view to financial and environmental viability;
- reading and using quantitative genetics information, and managing innovation in molecular biotechnologies for quantitative-qualitative improvement of animal production;
- managing inputs and assessing organoleptic and technological characteristics of poultry and aquafarming products;
- making business decisions based on agricultural policy, especially CAP developments.

Professional profile and employment possibilities

Graduates may work in the following management, coordination, planning and operating positions:

- technical, financial and administrative management of animal breeding and fodder businesses;
- organization and distribution of technical support services to farmers and breeders;
- animal feed companies and providers of equipment, facilities, machinery, technologies and services for animal breeding;
- organization and control of production protocols and value chain quality assurance;
- agri-food businesses processing, distributing and marketing produce and meat and dairy products;
- agri-food marketing (dairy, meat and cured-meat products, etc.)
- professional practices and administrative, legal, technical and financial consultancy firms working with agricultural and livestock farms;
- technical departments of the public administration and agri-livestock trade associations.

1st COURSE YEAR (disactivated from academic year 2022/23) Core/compulsory courses/activities Curriculum-specific features Livestock systems		
Learning activity	Ects	Sector

Equipment, plants and machinery for livestock production	8	AGR/09, AGR/10
Genetics and animal reproduction	10	(6) AGR/17, (4) VET/01
Livestock, environment and food safety	8	AGR/19, AGR/18
Rabbit, poultry and aquaculture productions	8	AGR/20
	Total compulsory credits	34
2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Livestock systems		
Learning activity	Ects	Sector
Feed formulation and production Technologies	6	AGR/18
	Total compulsory credits	6

CURRICULUM: [G58-G] Precision farming

Qualifying Training Objectives

Learning objectives for this curriculum focus on precision agriculture criteria and methods for site-specific farm management and the optimization of production processes, digital, sensor and automation technologies used in precision agriculture. Graduates are highly-trained specialists with the following skills: managing precision agriculture technologies, data and methods for maximizing production efficiency, financial and environmental viability; providing data acquisition/management and digital technology services for agricultural and livestock farms; developing and designing tailored precision agriculture systems.

Skills acquired

Students will develop a multidisciplinary understanding of precision agriculture, and the specialist skills required for its applications in agricultural and livestock businesses, for using digital data acquisition and management technologies, for creating management solutions, and for optimal use of precision machines and systems. More specifically, courses for this curriculum provide basic knowledge and operational tools for:

- using remote sensing and proximal sensing technologies on crops on a varying spatio-temporal scale, applying different data analysis approaches for key crop parameters assessment and geostatistical techniques for spatio-temporal data variability analysis;
- developing agronomic and hydrological modelling applications for site-specific identification of limiting factors, for the definition of site-specific prescription maps of inputs at different stages of the production cycle (sowing, fertilization, irrigation, protection);
- understanding and using key operating principles and features of ICT applications for precision agriculture, field sensors and ground sensing devices, actuators for site-specific input distribution;
- managing machines and field systems equipped with VRT systems;
- acquiring and managing field data and precision agriculture technologies for planning, collecting and processing ground sensing and remote sensing data and for processing prescription maps for site-specific distribution of inputs and qualitative/quantitative production monitoring;
- managing precision animal husbandry technologies, livestock monitoring sensors and precision feeding systems for improving efficiency in livestock breeding.

Professional profile and employment possibilities

Graduates may work in the following management, coordination, planning and operating positions:

- technical farm management using precision farming applications;
- highly specialized service providers in the field of data acquisition and management, digital precision agriculture technology output, machine, farm and barn interfaces;
- digital technology and ICT suppliers for agriculture, development/integration of precision agronomy modelling applications;
- highly innovative start-ups for the agri-food system;
- professional practices and technical advisory services for agricultural process planning and management using site-specific and remote-sensing data for determining and forecasting crop needs.

1st COURSE YEAR (disactivated from academic year 2022/23) Core/compulsory courses/activities Curriculum-specific features Precision farming		
Learning activity	Ects	Sector
Geomatics in agriculture	8	AGR/08, ICAR/06
Hydrology and irrigation systems for agriculture	8	AGR/08
Mechanization of agricultural processes	8	AGR/09
	Total compulsory credits	24
2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Precision farming		
Learning activity	Ects	Sector
Machinery, plants and equipment for precision farming	8	AGR/09, AGR/10
Precision farming	8	AGR/19, AGR/02
	Total compulsory credits	16