



UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2024/25
BACHELOR
DIGITAL SYSTEMS IN AGRICULTURE (Classe L-P02)
Enrolled from academic year 2023/2024

HEADING

Degree classification - Denomination and code:	L-P02
Degree title:	Dottore
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	1st , 2nd
Access procedures:	Cap on student, student selection based on entrance test
Course code:	G32

PERSONS/ROLES

Head of Study Programme

Prof. Aldo Calcante

Tutors - Faculty

A-C: Prof. Lucio Brancadoro

D-F: Prof. Aldo Calcante

G-L: Prof. Giorgio Provolo

M-O: Prof. Daniele Masseroni

P-R: Prof. Roberto Oberti

S-U: Prof. Domenico Pessina

V-Z: Prof.ssa Maddalena Zucali

Tutor per la mobilità internazionale e l'Erasmus: Prof. Stefano Corsi

Tutor per trasferimenti: Prof. Roberto Oberti

Tutor per riconoscimento crediti: Prof. Roberto Oberti

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

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CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

Professionalizing degrees are new three-year university study programs aimed at a strong orientation towards the working environment and a direct operational applicability of the acquired skills.

In particular, the professionalizing degree program in Digital Systems in Agriculture is designed to train technical professionals who combine, on the one hand, general knowledge of agricultural systems, and on the other hand, advanced skills in configuring and interacting with integrated hardware and software systems within farm processes. This includes the extraction and management of data essential for optimizing production activities in agricultural, livestock, and small-scale processing contexts.

The educational path is characterized by a strong synergy between the university and companies in the Agriculture 4.0 sector, focusing on digital technologies for agricultural machinery and systems, as well as field and livestock ICT systems. With this approach, the course aims to develop specialized technologist with skills in digital systems. These skills, combined with technical knowledge specific to the agricultural domain, will enable graduates to operate supporting primary sector companies in the choice and use of hardware and software systems for agriculture.

In order to achieve a professional profile with the specified technical skills, the Digital Systems in Agriculture study

program has the following educational objectives:

General but comprehensive knowledge of agricultural systems as a whole and the main issues related to the sustainability of productions;

Basic knowledge in scientific disciplines related to the fundamental principles of production processes, the functioning of technologies used, and the economic-organizational aspects of activities;

Understanding of configuration criteria and acquisition of high operational skills for the management of hardware and software technologies used in business processes;

Acquisition of in-depth operational skills in the extraction, management, and processing of data useful for production activities;

Development of the ability to interact effectively and professionally with those who analyze or plan production processes;

Acquisition of adequate teamwork, communication, including in English, and self-updating skills, aimed at a rapid and effective integration into different work contexts.

The educational objectives of the study program also aim to develop the skills, abilities, and operational autonomy necessary for the practice of the professions of graduate agricultural expert and/or graduate agrotechnician, for which the professionalizing degree in Digital Systems in Agriculture is enabling.

Expected learning outcomes

Graduates in Digital Systems in Agriculture have the skills to operate as technologists of reference on various digital systems/data used in agriculture. Furthermore, thanks to their knowledge in the agricultural field, they can effectively interface, interpret, and respond to the needs of the primary production sector.

In particular, graduates use technical language appropriate for effective communication with agronomists, technical services, consultants, and managers of agricultural and livestock farms. They are familiar with the principles of agrotechniques employed in the cultivation of the most important types of crops, the main technical means used, essential aspects regarding crop protection, and sustainability goals in production. They have knowledge of modern breeding systems and the impact of technologies and management practices on the sustainability of zootechnical products and animal welfare. They are acquainted with the main aspects related to the quality and safety of vegetable and animal products and their optimal management by farms.

They also possess knowledge of the structural and functional aspects of the main types of machinery and systems used in agricultural production processes or for the preservation and initial processing of products. They can manage and operate on the main applications of sensor technologies and automation in agriculture, understanding their characteristics and operational functions. They are experts in the features and operational functions of management software for production processes in agriculture, including their interface with machinery and systems, data extraction procedures, and initial data processing. They can select and evaluate digital technologies suitable for the needs of specific application contexts and assist the agricultural enterprise in the full utilization of functionalities beneficial to its production processes.

Throughout the learning program, graduates will acquire adequate communication skills, including in English, and will be encouraged to work collaboratively with a constructive attitude, take care of their technical updates, and develop a high degree of autonomy to integrate quickly into work environments.

Professional profile and employment opportunities

Graduates in Digital Systems in Agriculture possess a professional profile with a strong technical focus, characterized by operational and managerial skills related to digital technologies specifically applied in agricultural, livestock, and primary processing contexts. The professional profile is supplemented by the acquisition of basic knowledge about the main technical methods of agricultural production, the technologies used, the organization of activities, and the outlines of the major issues faced by the modern agricultural system.

This integration of knowledge is of fundamental importance for the professional profile, allowing graduates in Digital Systems in Agriculture to optimize the application of their specialized skills, adapting them to the specific needs of the companies they collaborate with and effectively interfacing with the production processes in which these companies operate. Graduates in Digital Systems in Agriculture play roles in close technical assistance in agro-informatics and agro-electronics, providing support functions to agricultural sector companies in selecting digital technologies that align with their needs. They intervene in configuring hardware and software systems, interfacing them with other local or cloud-based technologies, and managing their routine usage. The aim is to ensure the full utilization of the functionalities of these systems for the benefit of productive activities in which they are adopted, within the framework of Agriculture 4.0.

In addition, graduates work with data generated by digital systems, configuring the acquisition and recording of parameters of interest. They use processing or visualization features included in software, integrate farm data with information from other external sources, export data of specific interest in formats useful for their use in company reports or for further processing with external applications. Graduates identify critical or alarm situations through the comparison of process data with benchmarks external to the farm, supporting the entrepreneur or those planning and analyzing business processes by researching and extracting specific information from company databases.

Thanks to the comprehensive nature of the course and the multiple disciplinary areas covered during traineeships, graduates can easily integrate into companies operating in various agricultural contexts, including large agro-industrial crops, horticulture, fruit and wine production, livestock farming, and animal production.

In these significant contexts, widely spread throughout the national territory in numerous specialized production districts, graduates in Digital Systems in Agriculture can naturally find employment opportunities in:

Companies producing digital technologies and ICT for agriculture.

Companies or industries manufacturing machinery and systems for agriculture.

Agricultural, livestock, fruit, wine, and vegetable farming companies.

Service and technical assistance companies for agriculture.

Contractor companies.

Companies selling, assisting, and repairing agricultural machinery and equipment.

Companies involved in the production, installation, assistance, maintenance, and sensor technology and automation for agriculture.

The attainment of the professionalizing degree in Digital Systems in Agriculture, as stipulated by current legislative regulations, enables the practice of the professions of graduate agricultural expert and/or graduate agrotechnician.

Initial knowledge required

Requirements and knowledge necessary for admission

To be admitted to the degree program, candidates must hold a high school diploma or an equivalent qualification obtained abroad, recognized as suitable, and possess adequate initial preparation. Specifically, a good understanding of basic scientific disciplines is required, with a depth comparable to that acquired through high school education. Additionally, candidates should demonstrate logical and comprehension skills, as well as sufficient abilities in written elaboration and oral expression in the Italian language.

Methods of verification of knowledge and personal preparation

In accordance with legal provisions (Article 4 of DM 446/2020), the degree program has a limited number of seats, tailored to the needs of the job market and the availability of external annual internships. For the academic year 2023-24, the number of available slots for enrolment in the first year is set at 50.

Access is regulated by the mandatory TOLC-LP test, designed to assess students' initial preparation in terms of basic mathematical knowledge and elementary comprehension and logical skills.

The valid test for admission to the degree program is the TOLC-LP, an online test administered by CISIA (Consorzio Interuniversitario Sistemi Integrati per l'Accesso - <https://www.cisiaonline.it>). The structure and topics of the test, along with other useful information, can be found on the page <https://www.cisiaonline.it/area-tematica-tolc-lauree-professionalizzanti/home-tolc-lp/>.

The TOLC-LP can be held at the University of Milan or at any other university affiliated with CISIA. Registration procedures and deadlines are indicated in the admission notice published on the programme website.

The test results will be communicated confidentially to each student, highlighting any deficiencies identified during the test itself.

Additional Training Requirements and Procedures for Remedying Deficiencies (OFA)

Students who are conditionally admitted to the degree program and receive an insufficient outcome in the mathematics section (score lower than or equal to half of the maximum value) will be assigned additional training requirements (OFA).

For students with OFA, a recovery program will be organized (in the September-October period), structured with online exercises on an e-learning platform and moments of discussion and clarification with a tutor. After participating in the recovery activities, students with OFA will be required to undergo a final assessment verification.

Compulsory attendance

Attendance at educational activities is strongly recommended and carefully monitored by the course of study. Attendance is mandatory for second-year labs and third-year internships.

Internship criteria

The practical evaluative external internship holds significant educational value and involves 50 Ects. The internship must be carried out externally, at companies specializing in digital systems in the agricultural sector, or at affiliated professional entities or studios.

Internship activities are coordinated by a supervising faculty member and a company tutor, aiming to provide an extended professional experience. By addressing a broad range of practical operational issues, the internship aims to strengthen acquired skills, integrating them with structured problem-solving procedures typical of realities of business scenarios.

Degree programme final exams

To be eligible for the final exam, students must have earned 176 credits and completed the company internship. The professional degree in Digital Systems in Agriculture is obtained through the drafting and presentation of a short written paper related to a project or practical solution of a case study encountered during the evaluative external practical internship under the guidance of the company tutor and supervisor.

The final exam will consist of an oral presentation of the paper, aiming to highlight the student's ability to identify and address managerial and operational aspects of digital systems in agriculture, applying the knowledge and skills acquired during the course of study.

For the purpose of qualifying for the practice of the professions of graduate agricultural expert and/or graduate agrotechnician, the final degree examination also includes the completion of a practical test that assesses the candidate's technical preparation on practical issues consistent with those encountered during the external internship.

Notes

In order to obtain their degree, students must be proficient in English at a B1 level under the Common European Framework of Reference for Languages (CEFR). This proficiency level may be certified as follows:

- By submitting a language certificate attesting B1 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/39322>). The certificate must be uploaded during the enrolment procedure, or subsequently to the portal <http://studente.unimi.it/uploadCertificazioniLingue>;

- By taking a placement test offered by the University Language Centre (SLAM) between October and December of the first year. Students 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 attesting to B1 or higher level.

Those who have not taken the placement test by the end of December or fail the end-of-course exam six times must obtain the necessary certification privately before graduating.

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.

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		
Learning activity	Ects	Sector
Animal husbandry and nutrition, and quality and safety of products of animal origin	6	(3) AGR/19, (3) AGR/18
Applied biology to agricultural systems	6	(2) BIO/05, (3) BIO/01, (1) BIO/04
Computer science for digital technologies in agriculture	6	INF/01
Cultivation, quality, and safety of plant products	12	(1.5) AGR/11, (2) AGR/02, (2) AGR/04, (1.5) AGR/12, (5) AGR/03
Economics and organization of the agri-food system	6	AGR/01
English assessment B1 (3 ECTS)	3	NN
Fundamentals of general and agricultural chemistry	6	(2) CHIM/03, (1) CHIM/06, (3) AGR/13
Fundamentals of mathematics and physics for agriculture	6	(3) MAT/07, (3) FIS/01

Machinery, plants, and production structures for agriculture	6	(2) AGR/08, (2) AGR/09, (2) AGR/10
Total compulsory credits	57	
2nd COURSE YEAR Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Digital technologies and IoT for agriculture	6	ING-INF/05
Laboratory of arboriculture and post-harvest technologies	10	NN
Laboratory of digital technologies for animal husbandry	10	NN
Laboratory of machines and technologies for precision agriculture	10	NN
Laboratory of technologies for plant productions	10	NN
Laboratory of water and agro-environmental resources	10	NN
Occupational health and safety	3	NN
Total compulsory credits	59	
Elective courses		
The student must also acquire 6 Ects by freely choosing from the courses offered by other degree programs within the Faculty and the University. Alternatively, they may allocate these credits to other training activities assessable in terms of credits. See also the paragraph Structure of the course - Presentation of the study plan.		
3rd COURSE YEAR (available as of academic year 2025/26) Core/compulsory courses/activities common		
Learning activity	Ects	Sector
Professional ethics	4	NN
Total compulsory credits	4	
End of course requirements		
Corporate internship	50	NN
Final exam	4	NN
Total compulsory credits	54	

COURSE PROGRESSION REQUIREMENTS

Exams beyond the first year can only be taken after passing the Fundamentals of Calculus and Physics for Agriculture exam or the OFA of Mathematics. The practical evaluative external internship can only start after successfully completing all mandatory exams in the first and second years.