UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2019/20
IN
PLANT SCIENCE - (Classe LM -6)
Enrolled from 2018/2019 academic year

HEADING

Degree classification - Denomination and code:	LM-6
Degree title:	Dottore Magistrale
Length of course:	2 years
Credits required for admission:	180
Total number of credits required to complete programme:	120
Course years currently available:	1st , 2nd
Access procedures:	Cap on student numbers,student selection based on entrance test
Course code:	F3B

PERSONS/ROLES

Head of Study Programme

Prof. Mirko Baruscotti

Degree Course Coordinator

Prof. Luca E. A. Gianfranceschi

Tutors - Faculty

Professors: Alex Costa, Piero Morandini, Paolo Pesaresi, Christel Carles, Florence Courtois, Gabrielle Tichtinsky

Degree Course website

http://www.ccdbiol.unimi.it

Matriculation and enrollment

http://www.unimi.it/ENG/admission/92320.htm

Plant Science master degree email

Email: plant.science@unimi.it

Student administrative office

Address: via Celoria, 22, 20133 Milan Tel. Phone: (+39) 199.188.128/From abroad: 0039 056676357 Students Information Service: http://www.unimi.it/ENG/student/52904.htm Email: www.unimi.infostudente.it

Student information office

Address: via Celoria, 26, 20133 Milan – 2nd floor, A Building Opening times: from Monday to Friday, 10:00 - 11:45 Website: http://www.ccdbiol.unimi.it Email: cl.biol@unimi.it

CHARACTERISTICS OF DEGREE PROGRAMME

Introduction

The Master's degree course in Plant Science is the result of an agreement between the University of Milan (UNIMI) and the University of Grenoble-Alpes (UGA), France. The master course is a collaborative effort planned to allow students to achieve two Master degrees, one from UNIMI and one from UGA. The agreement requires that students attend courses and take exams at either Universities. In particular, during the first year, students will be attending the first semester courses at UGA and the second semester at UNIMI. In their second year, depending on the location of laboratory where they decide to carry out the compulsory experimental thesis work, students will be free to decide whether to stay at UGA or at UNIMI.

General and specific learning objectives

The Plant Science master degree aims at training professionals with a solid and integrated cultural background in basic biology, appropriate for applications in different areas of biology, focusing mainly on plant science. The students will acquire a high level of scientific preparation and in-depth knowledge and skills, taking into consideration molecular and cellular aspects, without neglecting applicative goals such as plant breeding and the protection and preservation of natural

plant species. The graduated student will acquire high-level skills, which will enable him/her to use the latest technologies to study complex plant biological systems. The international character of the master course, the knowledge of English and the international experience are all highly appreciated aspects that should contribute to broadening the job perspectives of the graduated student, reaching beyond national borders.

Expected learning outcomes

The expected learning outcomes, expressed according to the Dublin descriptors are:

KNOWLEDGE AND UNDERSTANDING. The Plant Science master degree aims at training highly qualified experts in biology, in general and more specifically in plant science, who will be able to face the new challenges imposed by bioeconomy. To this aim, the master degree provides a solid theoretical foundation in basic biological disciplines and a comprehensive knowledge in specific areas of plant molecular and cellular biology: physiology, plant development, biochemistry, genetics and bioinformatics. Moreover, the student will be provided with a multidisciplinary knowledge of the most relevant and innovative methodologies and techniques required for data acquisition and analysis.

APPLYING KNOWLEDGE AND UNDERSTANDING. Students will acquire skills enabling them to apply the latest technologies to the study of plant biological systems. We expect students to acquire expertise enabling them to envisage the use and application of plants in various fields, ranging from the production of metabolites of nutraceutical/pharmaceutical interest, to the creation of new plant varieties meeting consumer and market needs. They will be able to carry out analysis and characterization of complex biological systems by applying innovative procedures and using state-of-art instrument. The will be able to interpret data obtained from laboratory observations and measurements.
Students are going to acquire knowledge about rules and procedures for patent formulation and technology transfer. One of the strengths of the master course are the lab training activities aimed at providing a solid practical foundation, highly appreciated when applying for qualified job positions.

DECISION-MAKING. At the end of the master course students are going to acquire independent judgment regarding: interpreting experimental data and mastering the appropriate tools in relation to different scientific and technical disciplines; designing and implementing complex experiments, by managing time and procedures; assessing and quantifying the final outcome; directing projects, structures and personnel; identifying new perspectives and innovative strategies of development; evaluating, interpreting and revising literature research data; professional deontology; ability to formulate analytical problems and to propose ideas and innovative solutions; information-retrieval skills, in relation to primary and secondary information sources, including information retrieval and evaluation on chemical topics through on-line computer searches.

COMMUNICATION SKILLS. Graduates will be able to work both autonomously and within group, operating with different degrees of autonomy, thus acquiring skills to access to the job market. The ability to communicate accurately and fluently in English, with foreign partners will be further increased by the by the UNIMI – UGA collaborative programme.

LEARNING SKILLS. Students will acquire adequate skills for the development and improvement of competences. They should be able to conduct online literature searches by accessing online databases and other sources. Competence in the use of instruments and methodologies, allowing personal knowledge to be continuously updated, is another of the master degree goals. Such skills, including the identification of specific information in plant science topics (through specialized texts, scientific journals etc.) and in related disciplines (including legal and economic ones), are essential for the management of complex projects.

The skills listed above will be achieved through lectures, seminars, laboratory internships and through an extended period of laboratory work required for the preparation of the final thesis. The achievement of course-specific educational goals will be assessed through regular written and/or oral exams.

Professional profile and employment opportunities

BIOLOGIST AND ASSIMILATED PROFESSIONS
The choice to offer a Master's Degree entirely in English and the close collaboration with UGA, where the student have to take part of the courses, allows the graduate to enter the national and foreign labor market.

The master's degree in Plant Science is equipped with in-depth and cutting-edge knowledge on molecular and cellular aspects of plants, whether they are model organisms or plants of agricultural interest, and their interactions with the environment.

The skills acquired in this degree course will allow the graduate to perform functions of high responsibility in professional fields such as:
- Basic and applied research activities in university laboratories, other public or private research institutions and in industry, with particular reference to plant organisms;
- Research and development of scientific methodologies for the study of plant biology;
- Responsibility functions in public or private sectors responsible for environmental protection and management, in biology research laboratories, in biotechnology and food industries and in all professional fields where a multidisciplinary approach to plant biology is required;

- Scientific dissemination and publishing activities.
- Teaching activities.
Graduates can take the state exam for the qualification to practice the profession of biologist and consequently obtain the enrolment in the National Order of Biologists (Ordine Nazionale dei Biologi, section A). They will also have access to PhD positions, specialization schools and other master's degrees.

Job opportunities:
• Universities and public and private research institutions;
• Public and private laboratories for biological, microbiological, genetic and quality control analyses;
• Biotechnological, pharmaceutical, chemical and biorefinery industries;
• Communication, scientific dissemination and information, scientific publishing;
• Plant genetic improvement and seed production;
• Agro-food sector;
• Production of molecules of food, industrial and pharmaceutical interest in plant systems;
• Cooperation and development in international organizations.

BIOTECHNOLOGIST
The graduated in Plant Science will be able to take high responsibility functions in all professional fields in which a deep knowledge of plant biology topics is required, particularly in those involving the use of plant biological systems and genetic engineering techniques for applications in various sectors.

Graduates can take the state exam for the qualification to practice the profession of biologist and consequently obtain the enrolment in the National Order of Biologists (Ordine Nazionale dei Biologi, section A). They will also have access to PhD positions, specialization schools and other master's degrees.

Job opportunities:
• Universities and public and private research institutions;
• Biotechnological, pharmaceutical, chemical and biorefinery industries;
• Plant breeding and seed production companies
• Cooperation and development in international organizations

BOTANIST
The graduated in Plant Science will be able to take high responsibility functions in all professional fields in which a complete knowledge of plant organisms is required, from the molecular and cellular level, to the organismic to the interactions between living organisms and the ecosystem.

Graduates can take the state exam for the qualification to practice the profession of biologist and consequently obtain the enrolment in the National Order of Biologists (Ordine Nazionale dei Biologi, section A). They will also have access to PhD positions, specialization schools and other master's degrees.

Job opportunities:
• Universities and public or private research institutions;
• Biotechnological, pharmaceutical, chemical industries and bi- refineries;
• Communication, dissemination and scientific information, scientific publishing
• Plant genetic improvement and seed production
• Agro-food sector
• Production of molecules of food, industrial and pharmaceutical interest in plant systems
• Cooperation and development in international organizations

RESEARCHERS AND TECHNICIANS WITH A DEGREE IN LIFE SCIENCES
The graduated in Plant Science will be able to take high responsibility functions in all professional fields in where it is necessary to develop and conduct research projects on concepts and theories dealing with plant science. The graduated student will be able to:
- Designs and carry out experimental research projects aimed at broadening and innovating the scientific knowledge on plants, including applications in applied sectors;
- Ensures the operation of laboratories and scientific equipment;
- Defines and apply scientific protocols in laboratory experiments and research activities on both basic and applied plant science.

Graduates can take the state exam for the qualification to practice the profession of biologist and consequently obtain the enrolment in the National Order of Biologists (Ordine Nazionale dei Biologi, section A). They will also have access to PhD positions, specialization schools and other master's degrees.

Job opportunities:

• Universities and research institutions
• Public and private research laboratories.

Pre-requisites for admission

Graduates of class L-13 Biological Sciences, who are recognized as fully satisfying the curriculum requirements, can apply to the master degree course in Plant Science, provided they have completed a training course consistent with the indications of the National CBUI College and they have the appropriate certificate. The requirements include:

- 66 ECTS in biological areas (SSD bio), of which at least 6 in BIO/01 Botanica generale (General Botany), BIO/02 Botanica sistematica (Systematic Botany), BIO/04 Fisiologia Vegetale (Plant Physiology), BIO/05 Zoologia (Zoology), BIO/06 Anatomia comparata e citologia (Comparative Anatomy and Cytology) (at least 12), BIO/07 Ecologia (Ecology), BIO/09 Fisiologia (Physiology), BIO/10 Biochimica (Biochemistry), BIO/11 Biologia Molecolare (Molecular Biology), BIO/18 Genetica (Genetics), BIO/19 Microbiologia Generale (General Microbiology).

- 12 ECTS in FIS/01 - FIS/08 Fisica (Physics), INF/01 – Informatica (Informatics), ING-INF/05 - Sistemi di elaborazione delle informazioni (Information processing systems), MAT/01-MAT/09 Mathematics.

- 12 CFU in CHIM/01 - Chimica analitica (Analytical Chemistry), CHIM/02 - Chimica fisica (Physical Chemistry), CHIM/03 - Chimica generale e inorganica (General and Inorganic Chemistry), CHIM/06 - Chimica organica (Organic chemistry).

Other graduate students in the same class L-13, who have not followed a training course in line with the indications of the CBUI or in class 12 Biological Sciences (ex DM 509/99), or in other classes, may be admitted provided they have an adequate number of ECTS, not less than 90 ECTS, in the disciplinary sectors (SSD) mentioned above;

For the students graduated in the L-25 class, i.e. agricultural and forestry science and technology (scienze e tecnologie agrarie e forestali) and related classes, ECTS acquired in the following disciplinary sectors: AGR02 Agronomia e Coltivazioni erbacee (Agronomy and field crops), AGR03 Arboricoltura generale e coltivazioni arboree (Arboriculture and Fruitculture), AGR/07 - Genetica agraria (Agricultural genetics), AGR/12 – Patologia vegetale (Plant pathology), AGR/13 Chimica agraria (Agricultural chemistry), AGR/16 microbiologia agraria (Agricultural Microbiology), AGR/17 Zootecnica Generale e Miglioramento Genetico (Livestock systems, animal breeding and genetics), VET/01 Anatomia degli Animali Domestici (Veterinary anatomy), VET/02 Fisiologia Veterinaria (Veterinary physiology), will be also be considered for admission.

Students must be proficient in English, with a B2 level of competence. Applicants are required to certify their knowledge of the English language in one of the following ways:
- B2 level certification (vantage or upper intermediate, as defined by the Common European Framework of reference for Languages: Learning, Teaching, Assessment; recognised certifications: http://www.unimi.it/studenti/100312.htm)
- A B2 result in the placement test given by the University of Milan on 13 June 2019. Candidates who do not have a valid certificate at the application will be contacted by the course secretariat to take the English placement test.

Candidates who do not participate or do not pass the test will not be admitted to the Master. Only in exceptional cases, candidates may be accepted provided their level of English proficiency, assessed during the interview, is unmistakably very good.

The adequate personal preparation of the candidates, their ability to communicate in English and their motivation are decisive elements for the admission and they are going to be verified and tested during the admission interview.

Programme structure

The regular duration of the Master degree course in Plant Science is two years, divided into 4 semesters. The Master programme includes compulsory courses, guided and free courses, and laboratory internships. The present document (Manifesto degli Studi) regulates the terms, timing and rules for the selection of the courses and the presentation of the student’s Learning Agreement (see below the Study Plan paragraph).

In the first year, all students, regardless of their home university, must attend the first semester at UGA, while the second semester will be held at UNIMI. In the second year, students are free to decide where to attend the following two semesters. Remote teaching will be available for some second year course to guarantee a wide choice of courses. During the second year, a considerable part of the student's commitment is dedicated to the research activities necessary for the preparation of the master thesis. This experience, as well as the highly practical internships, represents one of the most qualifying elements of the master degree, allowing the student to master the scientific methods of investigation, the most modern methodologies and techniques for data acquisition, analysis and processing. One of the main objectives is to provide, through a significant experience of lab experimental work, the opportunity to acquire both the cultural tools and the critical analysis skills necessary to carry out research activities and the management of projects and facilities.

To obtain the degree, the student must acquire 120 educational credits (ECTS). ECTS are a measure of the learning effort required from the student and correspond to a global load of 25 hours of activity which can be split as:
- 8 hours of traditional class lesson followed by 17 hours of personal study;
- 12 hours of practical and/or laboratory training, followed by 13 hours of personal rework;
- 25 hours of training activities related to traineeships and the preparation of the final exam.

In detail, the Master's Degree Course in Plant Science provides for the following:
- compulsory lessons in biological fields (36 ECTS, 24 of which in plant biology);
- guided choice courses (30 ECTS) covering the different biological areas, including topics such as applied physics, business management and agricultural specialties;
- 12 ECTS available to the student for free optional courses;
- 18 ECTS for qualified traineeships to be carried out in university laboratories or other institutions
- 24 ECTS dedicated to the preparation of the experimental thesis, which involves the development of an original research project and its discussion during the final test.

The official teaching of the master degree course results in the acquisition of credits to the extent set out in the Learning Agreement. The student's acquisition of the educational credits established for each teaching unit, even when the courses are divided into modules, is subject to passing each course final examination test, resulting in a mark.

In order to prepare students for the above tests, students enrolled in the master's degree course may also benefit from distance learning services established by UNIMI and those of UGA.

Conscientious objection policy

In the Plant Science Master degree the use of animals for teaching purposes is not allowed as stated by the law: art. 5f of the Legislative Decree 26/2014. Such procedures are allowed during the traineeships for thesis preparation. However, they must be carried out exclusively by authorized staff, since, in this case, the Legislative Decree 26/2014 does not apply. According to Italian law n. 413, October 12 1993, “Norme sull’obiezione di coscienza alla sperimentazione animale”, students have the uncontestable right to conscientiously object to participation in any experimental activity using animals. In this case, the Teaching Board will suggest alternative traineeships that are consistent with the educational goals of the Plant Science course, to ensure the correct acquisition of the study credits necessary for degree completion.

Campus

At the University of Milan, classrooms are located in the University buildings, via Celoria, 26 (Edifici Biologici); via Celoria, 20 (Settore Didattico); via Golgi, 19 (Edificio Golgi), via Colombo 62 (Settore Didattico via Colombo), via Celoria 2 (departments of Department of Agricultural and Environmental Sciences); most laboratories are located in the Department of Biosciences, via Giovanni Celoria 26, Milan and in the Department of Agricultural and Environmental Sciences - Production, Landscape, Agroenergy, via Giovanni Celoria 2, Milan.

At UGA, information is available at the following website: https://master-biologie.univ-grenoble-alpes.fr/majors/planta-international-plant-int-/planta-international-plant-int--298457.kjsp

Libraries

A large collection of online books, scientific journals and online databases is available to University of Milan students (Sistema Bibliotecario di Ateneo) at the following address: http://www.sba.unimi.it

Traditional libraries are available in Via Celoria, 26 (Biblioteca Biologica Interdipartimentale) and in via Celoria 2 (Biblioteca Centrale della Facoltà di Scienze Agrarie e Alimentari).

Tutoring

Tutors will provide students with academic advice, guidance on their course choices and advice on where and how to seek help with personal problems.

Core / compulsory activities

All above-mentioned training activities including mandatory, guided and open-choice courses and experimental research activities during the thesis internship are compulsory for completing a Master.

Compulsory attendance

Course attendance is compulsory

Testing and assessment procedures

ECTS are earned through lectures, exercises, laboratories and dissertation. Course exams must be passed, and each teaching units will be graded or approved for validation. Grades in Italy are calculated on a 30-point scale, to obtain course credits. The assessment will consist of an oral or written exam. For courses structured into modules, a head lecturer will be identified as the coordinator, and evaluation procedures for course outcomes and the registration of examination grades will be agreed by all associated teaching members. The schedule of the examination sessions for the assessment of the learning outcomes is available through the SIFA online Service. For each course, at least 6 sessions per year are scheduled, during January-February, June-July and September. In France the rules and the grading system is different, however, students must follow the host institution rules and regulations. The grading system and the conversion rules are available at http://www.ccdbiol.unimi.it

Procedures for exam registration and admittance

In order to allow ECTS to be accredited to the student’s personal record and transmitted to the host institution, for the exams taken in Italy, registration is compulsory and must be carried out through the SIFA website available at

http://www.unimi.it/hpsifa/. During mobility the students will follow the rules of the host institution concerning exam sessions and procedures. Results will be exchanged between the two universities and converted according to the local grading rules.

Study plan definition and submission for approval

All enrolled students shall follow a written study contract (so-called "Learning Agreement"). For this, each student will propose an individual study plan to the Joint Board of Studies (JBS), made according to the agreed curriculum This Learning Agreement needs to be approved by the JBS and signed by the JBS and the student, within the first month of the programme. Such Learning Agreement may be revised at any time with consent from the JBS. The newly modified version of the Learning Agreement has to be signed by the JBS and the student.

The final study plan must be submitted online in the 2nd Year, via the web address http://www.unimi.it/studenti/servizi_online.htm, within the deadline set by the Segreteria Studenti, generally between December and March. For information on dates and procedures for submitting the official study plan, please visit the relevant section of the UNIMI website. Please note that admission to the final exam depends on correlation between the list of passed exams and the last approved official study plan. In the event of discrepancies between the student's educational career and the relevant study plan, the student cannot be admitted to the final exam.

Internship criteria

Internships indicated in the teaching programme are compulsory and required to obtain the diplomas. Each internship will be evaluated and credited with ECTS. Voluntary internship (not credited with ECTS) may also be included when related to the study project or professional project.

The internships location and topic must be agreed upon by both Institutions via the JBS. The JBS shall name at least one academic supervisor for each internship.

According to French national rules, all students have to establish an internship agreement ("convention de stage") with UGA and the host institution or host company even if the internship takes place outside of France. This agreement has to indicate precisely the period of internship, according to the French regulation.

According to Italian national rules, all students have to establish specific internship agreements with UNIMI and the host institution or host company even if the internship takes place outside of Italy.

The internship of the Master thesis follows the general rules (above) for internship, with the following additions:
- The Master's thesis must be carried out under the supervision of two supervisors, one named by the home institution and the other by the host institution and both approved by the JBS.
- The final degree project will be a report written in English

The presentation of the master thesis shall take place in the student home University.

Degree programme final exam

The Plant Science Master Degree will be obtained by passing a final assessment, which consists of submitting and presenting a dissertation in English on the research performed by the student during his/her thesis internship. Students will receive their degree and final evaluation from a thesis committee that includes at least one representative of UGA who, if needed, may be connected by videoconference. The thesis work will be illustrated and questioned in English by the student in a public debate in front of the thesis committee. The committee will evaluate the work and express a final judgment on the thesis work and on the student's overall performance in two-year Master. The final grade will be on a 110-point scale. The degree issued by the Committee is "Laurea Magistrale" (Master Degree) in Biology, in relationship to the Master in Plant Science.

The JBS will take care to communicate the results – including the evaluation of the thesis - to the partner University for the awarding of the UGA Master Diploma.

Lecture timetable

The first Semester (UGA) starts on September 2nd 2019 and ends on January 31st 2020.
The second Semester starts on March 2nd 2020 and ends on June 19th 2020.
The complete timetable of the individual courses will be posted at the following addresses:
UNIMI http://www.ccdbiol.unimi.it
UGA https://master-biologie.univ-grenoble-alpes.fr/majors/planta-international-plant-int-/planta-international-plant-int--298457.kjsp

EXPERIENCE OF STUDY ABROAD AS PART OF THE DEGREE PROGRAM

The University of Milan supports the international mobility of its students, offering them the opportunity to spend periods of study and training abroad, a unique opportunity to enrich their curriculum in an international context.

Study and internships abroad

Students admitted to the Plant Science Master degree will receive a contribution to support higher costs arising from their stay at UGA. The level of each contribution will relate to the ISEE declared by the relevant student.
For assistance, please contact:
Ufficio Accordi e Progetti Internazionali per la Didattica e la Formazione
International Relations Office
Via Festa del Perdono, 7 (first floor)
Phone: (+39) 02.503 13500 - 13494
e-mail: international.education@unimi.it

ADMISSION CRITERIA: 1ST YEAR CAP ON STUDENT, STUDENT SELECTION BASED ON ENTRANCE TEST

Application and enrolment information and procedures

APPLICATION FORM

Both Italian and foreign students must submit admission applications by the deadlines indicated in the "student area" of the University of Milan website. Undergraduates who intend to achieve a Bachelor degree in Sciences (or equivalent) before 31 July 2019 may also apply. Completion of the application form is compulsory and must be submitted electronically to the following address: http://www.unimi.it/studenti/servizi_online.htm

BACKGROUND KNOWLEDGE

The prerequisite to access the Plant Science Master Degree program is an adequate knowledge of the fundaments of biological disciplines. This will be verified through 1) evaluation of the bachelor study program and 2) direct assessment of candidate scientific background knowledge. The candidate's background knowledge in Biology will be verified by an interview with the Commission for Admittance to the Master, composed by teaching members appointed by the Teaching Board. The interview will evaluate the expertise of the candidate in topics related to Plant Science degree, and will ascertain the knowledge of the English language.
The committee evaluates the candidate on a 100-point scale:
-up to 25/100 will be given for the graduation grade; for undergraduates the average grade of the sustained teaching activities will be evaluated;
-up to 10/100 for the curriculum (type of degree, extra-curriculum free courses, Erasmus experience, etc.)
-up to 65/100 for the interview
The minimum requirement for admission is 60/100.
For the Academic Year 2019-2020, interviews will take place at the Department of Biosciences, Via Celoria 26, Building A, 2nd floor, on June 20th, 2019. Students must have a valid ID card for identification. Foreign applicants who are not resident in Italy and have achieved their bachelor degree abroad will be evaluated based on their curriculum and may be invited to an online interview. Foreign students who reside in Italy must attend the evaluation interview on June 20th, 2019. It is advisable to check for any possible updates concerning dates and times of the examination on the website: http://www.ccdbiol.unimi.it

Practical instructions

ENROLLING IN THE PLANT SCIENCE COURSE

Once the results have been published, students who occupy the first ten positions in the merit ranking must complete their enrolment within the deadlines set out in the competition notice. Subsequently, if positions are not saturated, enrolment will be possible for students with lower merit ranking, provided they have achieved at least 60/100 in the admission test. Enrolment of undergraduates will be validated only if they obtain their Bachelor's degree by 31 July 2019. Students from other Universities, upon graduation by 31 July 2019, must present certification of the awarded degree at the Segreteria Studenti.

N° of places reserved to non-EU students resident abroad

3

Number of places assigned

10

ADMISSION CRITERIA: 2°YEAR CREDIT-BASED:NUMBER OF ECTS40

1st COURSE YEAR Core/compulsory courses/activities

Scheduling	Learning activity	Module/teaching unit	Ects	Sector
1 semester	Evolutionary Biology of Plants *(UGA)*		6	BIO/02
1 semester	Introduction to Plant development and Signal transduction *(UGA)*		6	BIO/01
1 semester	Strategies in Experimental Biology *(UGA)*		12	BIO/11, BIO/10, BIO/18, BIO/04
2 semester	Plant development		6	BIO/01
2 semester	Plant signal transduction		6	BIO/04

		Total number of compulsory credits/ects	36	

Further elective courses				
The student must choose one of the following courses:				
1 semester	EvoDevo in the green lineage *(UGA)*		6	BIO/02
2 semester	Plant ecology		6	BIO/02
The student must choose one of the following courses:				
1 semester	Chemistry and Cellular Biochemistry *(UGA)*		6	BIO/10
1 semester	Epigenetics and cell differentiation *(UGA)*		6	BIO/18
1 semester	Functional genomics		6	BIO/18
1 semester	Molecular bioinformatics		6	BIO/11
1 semester	Molecular genetics and epigenetics of the cell *(UGA)*		6	BIO/18
1 semester	Photobiology and bioenergy		6	BIO/18, BIO/04
2 semester	Advanced Plant Cell Biotechnology		6	BIO/18, BIO/04
2 semester	Molecular plant breeding and Genetics		6	BIO/18
The student must choose one of the following courses:				
1 semester	Biostatistic, Bioinformatics and Modeling *(UGA)*		6	BIO/13
1 semester	High-throughput Biology *(UGA)*		6	BIO/13
1 semester	Patenting and technology transfer		6	IUS/14, IUS/10
2 semester	Plant metabolic engineering and Nutrigenomics *(Not active in 2019/2020 academic year)*		6	BIO/13
The student must choose one of the following courses:				
1 semester	Basic Statistics and Experimental design		6	SECS-S/02, AGR/02
1 semester	Molecular and Cellular Imaging		6	FIS/07, FIS/03
2 semester	Development of Crop Ideotypes		6	AGR/07
2 semester	Environmental Plant Biochemistry and Physiology		6	AGR/13
The student must choose one of the following courses:				
1 semester	Communication tools and Scientific English *(UGA)*		6	L-LIN/12, SPS/08
1 semester	Entrepreneurship and Science and Scientific English *(UGA)*		6	SECS-P/09, SECS-P/07, L-LIN/12
Open choice courses: the student must acquire 12 CFU				
End of course requirements				
year	Final dissertation		24	NA
year	Internship 1		12	NA
year	Laboratory stage		6	NA
		Total number of compulsory credits/ects	42	

COURSE PROGRESSION REQUIREMENTS

There are no propaedeutic courses in Plant Science that can limit progression from the first to the second year.
First year students must acquire 40 ECTS within September 30 in order to be admitted to the second year.

VALIDATION OF ECTS ACQUIRED IN OTHER/PREVIOUS DEGREE PROGRAMMES/ THROUGH PROFESSIONAL EXPERIENCE

Validations of previously acquired ects

CFU ACQUIRED IN OTHER MASTER'S

Students requesting a transfer from another Master program to Plant Science, will undergo the audit of an ad hoc committee that will decide if and how many of the CFU previously acquired by the student can be validated upon admittance to Plant Science.

CFU ACQUIRED DURING PROFESSIONAL EXPERIENCES

A maximum of 9 CFU can be acquired (according to art. 5, comma 7, del DM 270/2004) by certified professional experiences and by post-secondary level educational activities performed in association with the University.