



Curriculum

for the Master Programme

Erasmus Mundus Master Program in Plant Breeding (emPLANT+)

Programme classification no.

Effective date: 1.10.2021



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§ 1 QUALIFICATION PROFILE

The master programme “Erasmus Mundus Master Program in Plant Breeding (emPLANT+)” is a degree programme which serves to deepen and extend students’ pre-vocational academic education, building on the basis provided by a bachelor degree programme (§ 51 [2] item 5 of the Universities Act UG 2002, Federal Law Gazette BGBl I no. 81/2009). The programme fulfils the requirements of Directive 2005/36/EC on the recognition of professional qualifications, article 11, letter e.

1a) Knowledge and personal and professional skills

After completion of the emPLANT+ master program, graduates will be able to:

- Describe the current global and regional context of plant breeding, and reflect on its social, economic and ethical aspects.
- Master and apply in an academic and practical context
 - advanced knowledge in planning and implementing a plant breeding program
 - subject-specific statistics, data analysis and interpretation
 - quantitative and molecular genetics in relation to plant improvement
 - communicate fluently using the appropriate scientific vocabulary
- Identify and analyse key factors and forces behind plant breeding problems and relate their own discipline to a multidisciplinary framework.
- Suggest and create solutions for a given problem in plant breeding by applying appropriate research methods, instruments and tools and organise, monitor and evaluate results within their specialisation, while
 - collecting and mastering relevant information and literature
 - understanding and applying the most appropriate methods to conduct breeding research
 - reflecting critically on own and literature research work and adjusting and suggesting improvements
 - concluding and pointing out practical recommendations based on the analysis of results
- Present oral and written reports of study and research activities, considering the nature of the audience.
- Adapt and apply obtained knowledge and skills to different working and cultural environments.
- Demonstrate the learning and organisational skills for continuing studying in a manner that may be largely self-motivated or autonomous.
- Operate in an international context in both content and social-cultural aspects, both independently and in a team.

1b) Professional qualifications

- The objective of the Erasmus Mundus Master Program in Plant Breeding (emPLANT+) is to train and prepare students on a high level, with the primary focus on the theoretical background and the current research and implementation practices for modern plant breeding.

- Consequently, graduates will be well prepared to pursue follow up qualifications in academia, such as a doctoral study at BOKU or elsewhere.
- Graduates of the emPLANT+ program will be well trained and fit to work successfully on advanced level positions in public or private breeding companies, breeding organisations, cultivar testing and registration organizations, crop plant extension services, the seed sector and/or in other parts of the plant breeding and seed industry, acting for example but not exclusively as plant breeders, product managers, seed specialists, geneticists, or consultants.

§ 2 ADMISSION REQUIREMENTS

Graduates of the bachelor's programme(s) in Agricultural Sciences offered by BOKU - University of Natural Resources and Life Sciences Vienna are eligible for admission with no further requirements.

For graduates of other bachelor's programmes (min. 180 ECTS), mastery of the following learning outcomes is required for admission:

- Knowledge and skills in the basics of agricultural sciences, *i.e.* chemistry, physics, mathematics or statistics, botany or plant sciences, microbiology, genetics and economics.
- Knowledge and skills in the basics of plant production, *i.e.* plant production, plant nutrition, plant pathology, plant breeding.

Language skills

Minimum B2/C1 level in English (Common European Framework of Reference for Languages)

Equivalent proofs are the following:

- Official English test:
 - TOEIC: minimum 785 points
 - IELTS Academic: minimum 6.0
 - TOEFL: 577 paper-based, 233 computer-based, 90-91 internet-based; TOEFL Home Edition will not be accepted
 - Cambridge: Certificate in Advanced English
- Completion of a study programme that was entirely taught in English from countries with English as official language.
- Successfully passed school-leaving examination in English from a recognized domestic or foreign educational institution, provided that the country of issue's educational regulations offers level B2. If the school leaving certificate does not confirm level B2 of the European frame of reference, a confirmation from the appropriate ministry must be submitted.

§ 3 PROGRAMME STRUCTURE

3a) Duration, total ECTS credits, and structure

The programme consists of courses and other requirements worth a total of 120 ECTS credits. This is equivalent to a duration of four semesters (a total of 3,000 60-minute credit hours).

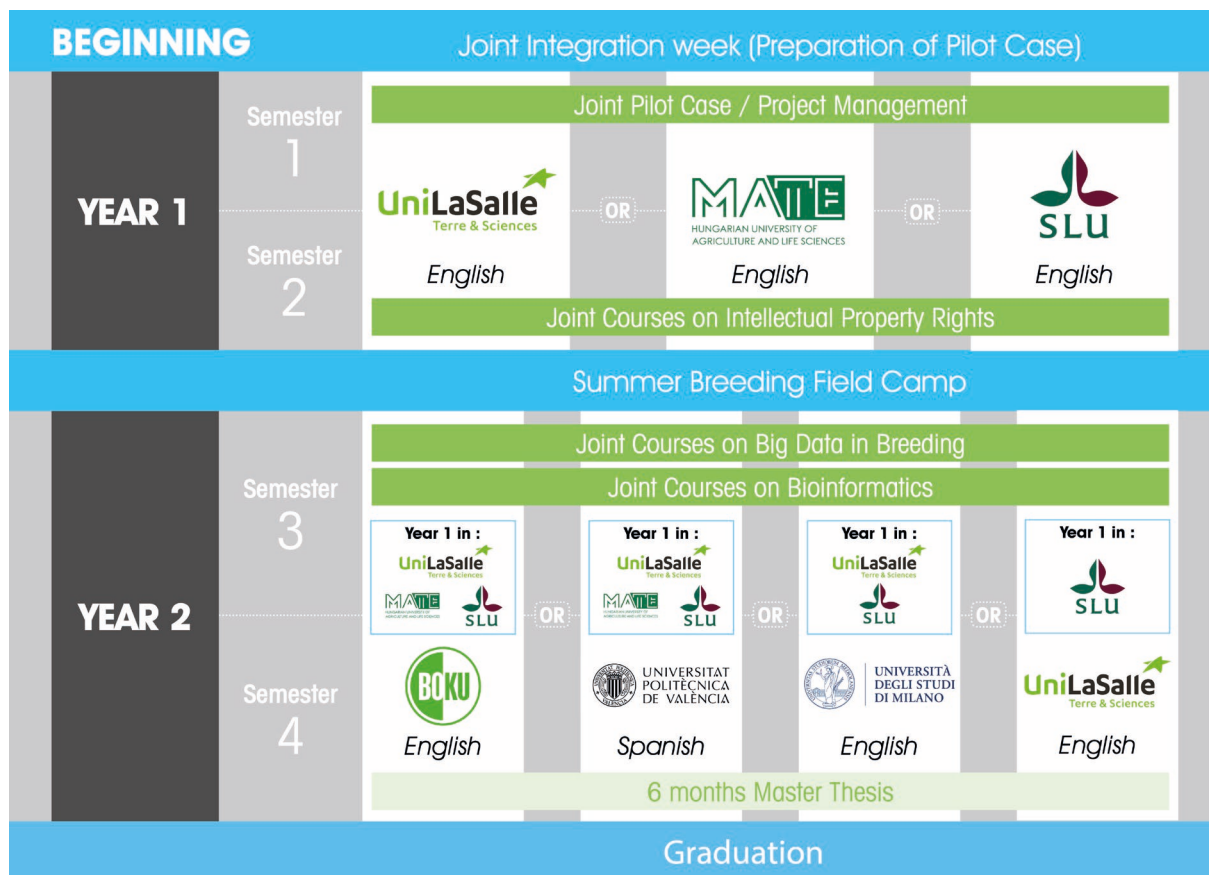
Overall structure of the Erasmus Mundus Master Program in Plant Breeding (em-PLANT+)

emPLANT+ has received funding from the European Union in the framework of the Erasmus Mundus Joint Master Degrees (EMJMD) program.

emPLANT+ is an international master program offered in close cooperation of six leading European universities:

- Institut Polytechnique UniLaSalle (France) – ULS (coordinator)
- University of Natural Resources and Life Sciences, Vienna (Austria) - BOKU
- The Swedish University of Agricultural Sciences (Sweden) – SLU
- University of Milano (Italy) – UMIL
- Universitat Politècnica de Valencia (Spain) – UPV
- Hungarian University of Agriculture and Life Sciences (Hungary) - MATE

Figure 1: emPLANT+ mobility tracks



The BOKU curriculum for emPLANT+

BOKU will host emPLANT+ students in year 2, equivalent to 60 ECTS, while year one, equivalent to 60 ECTS, has to be performed at either UniLaSalle (ULS, France), Hungarian University of Agriculture and Life Sciences (MATE, Hungary) or the Swedish University of Agricultural Sciences (SLU, Sweden), as outlined in Figure 1.

For detailed information about courses offered at the partner universities please refer to the homepages of ULS, SLU, MATE, UMIL and UPV, and the homepage of the emPLANT+ master program.

The BOKU curriculum for emPLANT+ is outlined in the following paragraphs and consists of

- Compulsory courses: 21 ECTS credits (§4)
- Elective courses: 6 ECTS credits (§5)
- Free elective courses: 3 ECTS credits (§6)
- Master thesis: 30 ECTS (§7)

3b) Three-pillar principle

The emPLANT+ master program complies with three-pillar principle at the University of Natural Resources and Life Sciences, Vienna. In the emPLANT+ master programme of year 2 at BOKU, the weighted sum of the compulsory and elective course is structured as follows:

- 15% technology and engineering
- 15% natural sciences
- 15% economic and social sciences, law

The master thesis, internship and free electives are excluded from the three-pillar rule.

3c) Joint degree programmes

The program will award double or multiple degrees.

§ 4 COMPULSORY COURSES

For students completing their year two of the emPLANT+ study at BOKU, the following compulsory courses at BOKU are required to complete the master programme.

Subject (Module)	Course type	ECTS credits
Course title		
Molecular plant breeding	VO	3
Molecular plant breeding practical	UE	4
Master thesis seminar	SE	2
Plant breeding - principles and methods	VO	3
Plant breeding - principles and methods - practical exercises	UX	3
Bio informatics ¹⁾	PJ	2
Big data ¹⁾	PJ	2
Pilot case ¹⁾	PJ	2

¹⁾ common joint online courses to be taken by ALL emPLANT+ students

§ 5 ELECTIVE COURSES

Elective courses worth a total of 6 ECTS credits are required to complete the master programme. See also for recommendations depending on first year university (see footnotes).

Subject (Module)	Course type	ECTS credits
Course title		
Experimental design and analysis of field and laboratory trials ²⁾	VU	3
Quantitative genetics for plant breeders ³⁾	VU	3
Resistance breeding of crop plants	VO	3
Molecular mechanisms of fungal virulence and plant resistance	SE	3
Gene technology for plant pathologists	VO	3
Molecular evolution and phylogenetics	VO	1
Global change and pest management	VO	3
Plant metabolomics	VU	5
Aspects of product quality in plant production	VX	4
Bioinformatics lab rotation	VU	2
Genetics of diversity	VO	3
Quantitative animal genetics	VO	6

²⁾ highly recommended for students who studied their first year at ULS or at SLU

³⁾ highly recommended for students who studied their first year at MATE or SLU

§ 6 FREE ELECTIVES

Free electives worth a total of 3 ECTS credits are required to complete the master programme. Free electives may be selected from all courses offered by all recognized universities in Austria and abroad. Free electives are intended to impart knowledge and skills in the student's own academic subject as well as in fields of general interest.

§ 7 MASTER THESIS

A master thesis is a paper on a scientific topic, to be written as part of a master degree programme (for exceptions please see the By Laws (Satzung) of the University of Natural Resources and Life Sciences, Vienna, part E, § 86). The thesis is worth a total of 30 ECTS credits. With their master theses, students demonstrate their ability to independently address a scientific topic, both thematically and methodologically (§ 51 [8] UG 2002 BGBl. I no. 81/2009).

The master thesis is supervised by a lecturer from the University of Natural Resources and Life Sciences, Vienna. The topic of a master thesis shall be chosen in such a way that it is reasonable to expect a student to be able to complete it within six months. Multiple students may jointly address a topic, provided that the performance of individual students can be assessed (§ 81 [2] UG 2002 BGBl. I no. 81/2009).

The master thesis shall be written in English. Languages other than English are permissible only if approved and confirmed by the thesis supervisor. The thesis defensio must be held in English regardless of the language of the written thesis.

§ 8 COMPLETION OF THE MASTER PROGRAMME

The master programme in Erasmus Mundus Master Program in Plant Breeding (emPLANT+) has been completed when the student has passed all required courses and received a positive grade on the master thesis and the defensio.

§ 9 ACADEMIC DEGREE

Graduates of the Erasmus Mundus Master Program in Plant Breeding (emPLANT+) are awarded the academic title Master of Science, abbreviated as MSc or M.Sc. The academic degree MSc (M.Sc.), if used, shall follow the bearer's name (§ 88 [2] UG 2002 BGBl. I no. 81/2009).

§ 10 EXAMINATION REGULATIONS

(1) For the master programme emPLANT+ the respective examination regulations of the partner universities must be adhered to in addition to the BOKU examination regulations termed here. For detailed information about the respective examination regulations at the partner universities please refer to the homepages of ULS, SLU, MATE, UMIL and UPV.

The master programme Erasmus Mundus Master Program in Plant Breeding (emPLANT+) has been completed successfully when the following requirements have been met:

- positive completion of the courses at the respective year 1 university in emPLANT+, according to the rules of the respective year 1 emPLANT+ university. For detailed information about courses offered at the partner universities please refer to the homepages of ULS, SLU, MATE, UMIL and UPV, and the homepage of the emPLANT+ master program.
- positive completion of the BOKU compulsory courses worth a total of 21 ECTS credits (§ 4)
- positive completion of the BOKU elective courses worth a total of 6 ECTS credits (§ 5)
- positive completion of free electives worth a total of 3 ECTS credits (§ 6)
- a positive grade on the master thesis and the defensio.

(2) Student evaluation takes the form of course and module examinations. Course examinations can be either written or oral, as determined by the course instructor, taking the ECTS credit value of the course into account. Any prerequisites for admission to examinations shall be listed in § 4 under the respective course/module.

(3) Student evaluation in modules: Module evaluation is based on the grades given the students in the individual courses that make up the module. The total evaluation for the module is calculated as the average of the grades of all module courses, weighted by ECTS credits. Average values of .5 or lower are rounded to the better (numerically lower) grade; values of over .5 are rounded to the worse (numerically higher) grade. If deemed necessary, the Dean of Students may require a module examination at his/her discretion.

(4) The choice of examination method shall be based on the type of course: Lectures shall conclude with a written or oral examination, if continuous assessment of student perfor-

mance is not applied. Seminars (SE) and project-based courses (PJ) can be evaluated based on independently written papers, length and contents of which are determined by the course instructor. For all other course types, the examination type is at the instructor's discretion.

(5) After the successful completion of all the courses and examinations required in the master programme, the completed master thesis, after it has been given a positive evaluation by the thesis supervisor, shall be publically presented by the student and defended in the form of an academic discussion (defensio). The committee shall consist of a committee chair and two additional university teachers with a *venia docendi* or equivalent qualification. The student's total performance (thesis and defensio) will be assigned a comprehensive grade. Both thesis and defensio must receive a passing grade for the student to complete the programme. The written evaluations stating the rationale for the thesis grade and the defensio grade are included in calculating the comprehensive grade and are documented separately.

The comprehensive grade is calculated as follows:

- Master thesis: 70%
- Defensio (incl. presentation): 30%

(6) A comprehensive evaluation of the student's performance on the entire programme shall be assigned. A comprehensive evaluation of "passed" means that each individual component of the programme was completed successfully. If individual components of the programme have not been successfully completed, the comprehensive evaluation is "failed". A comprehensive evaluation of "passed with honours" is granted if the student has received no grade worse than a 2 (good) on all individual components, and if at least 50% of the individual components were graded with 1 (excellent).

§ 11 EFFECTIVE DATE

This curriculum shall take effect on 1.10.2021.

ANNEX A TYPES OF COURSES

The following types of courses are available:

(Please only offer course types included in this list from now on.)

Lecture (VO)

Lectures are courses in which certain areas of a subject and the methods used in this area are imparted through didactic presentation.

Exercise course (UE)

Exercise courses are courses in which students are instructed in specific practical skills, based on theoretical knowledge.

Practical course (PR)

Practical courses are classes in which students deal with specific topics independently, based on previously acquired theoretical and practical knowledge.

Compulsory internship seminar (PP)

The compulsory internship seminar is a class in which students deal independently with topics related to their internship placements, based on previously acquired theoretical and practical knowledge.

Seminar (SE)

Seminars are courses in which students are required to work independently on the respective subject, deepen their knowledge of the topic and discuss relevant issues.

Field trips (EX)

Field trips are courses in which students have the opportunity to experience relevant fields of study in real-life practical application, to deepen their knowledge of the respective subject. Field trips can be taken to destinations both in Austria and abroad.

Master thesis seminar (MA)

Master thesis seminars are seminars intended to provide students with academic support during the thesis writing process.

Mixed-type courses:

Mixed-type courses combine the characteristics of the courses named above (with the exception of project-type courses). Integration of different course-type elements improved the didactic value of these courses.

Project course (PJ)

Project courses are characterized by problem-based learning. Under instruction, students work - preferably in small groups - on case studies, applying appropriate scientific methods.

Lecture and seminar (VS)

Lecture and exercise (VU)

Lecture and field trip (VX)

Seminar and field trip (SX)

Exercise and seminar (US)

Exercise and field trip (UX)