



No. _____ of _____

USAMV form 0101040104

SUBJECT OUTLINE**1. Information on the programme**

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca
1.2. Faculty	Agriculture
1.3. Department	II - Crop science
1.4. Field of study	Agriculture
1.5. Cycle of study ¹	Bachelor of Science
1.6. Specialization/ Study programme	Agriculture
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name		Plant breeding 2						
2.2. Course coordinator				Associate professor dr. Leon MUNTEAN				
2.3. Seminar/ laboratory/ project coordinator				Assistant professor dr. Andreea ONA				
2.4. Year of study	IV	2.5. Semester	II	2.6. Evaluation type	Summative	2.7. Discipline status	Content ²	DD
							Compulsoriness ³	DI

3. Total estimated time (teaching hours per semester)

3.1. Hours per week - full time programme	4	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	2
3.4. Total number of hours in the curriculum	40	out of which: 3.5. lecture	20	3.6. seminar/laboratory	20
Distribution of the time allotted					hours
3.4.1. Study based on books, textbooks, bibliography and notes					25
3.4.2. Additional documentation in the library, electronic platforms and field experiences					15
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					10
3.4.4. Tutorials					-
3.4.5. Examinations					9
3.4.6. Other activities					6
3.7. Total hours of individual study	65				
3.8. Total hours per semester	105				
3.9. Number of credits ⁴	5				

4. Prerequisites (if applicable)

4.1. curriculum-related	Genetics, Botany, Experimental Design, Physiology, Biochemistry, Plant Breeding (I)
4.2. skills-related	The student must possess knowledge of the biology main field crops (wheat, barley, oats, rice, corn, sunflower, sugar beet, potato, clover), molecular and population genetics, comparative cultures with cultivars.

5. Conditions (if applicable)

5.1. for the course	The course is interactive; students can ask questions and make comments about the course content. Academic discipline requires compliance schedule. We do not allow any other activities during the lecture, mobile phones and tablets must be kept closed.
5.2. for the seminar/ laboratory/ project	To participate in the practical work is absolutely mandatory consultation of practical work guide; students will have individual activities with study materials (plants, fruiting, seed, etc.).

6. Cumulated specific competences

Professional competences	<ul style="list-style-type: none"> - To acquire specific language plant breeding. - To know the general methodology used in plant breeding pollinated of self-pollinated plants, cross-pollinated plants and those with vegetative propagation. - To acquire methodology to obtain inbred lines and commercial hybrids. - To know the specific types of crop cultivation.
Transversal competences	<ul style="list-style-type: none"> - To be able to develop projects for study of initial biological material: winter wheat, corn, sunflower, potato, red clover, perennial grasses. - To know the methodology for the study of new cultivars in field trials, including scoring and determination. - To know how future specialist will document for identification of the best existing cultivar on seed market.

7. Discipline objectives (based on the cumulated specific competences)

7.1. General objective	Knowing the objectives and methodology of breeding in wheat, barley, oats, rice, corn, sunflower, sugar beet, potato, fodder.
7.2. Specific objectives	Knowing the main sources of germplasm, classical and modern methods of plant breeding, achievements in the field of plant breeding and seed production techniques.

8. Content

8.1. COURSE Number of hours - 20	Teaching methods	Observation
1. Breeding of cereals.	Lectures	3 lectures
2. Breeding of pulse crops.	Lectures	1 lecture
3. Breeding of maize.	Lectures	2 lectures
4. Breeding of sunflower.	Lectures	1 lecture
5. Breeding of sugar beet.	Lectures	1 lecture
6. Breeding of potato.	Lectures	1 lecture
7. Breeding of forage crops.	Lectures	1 lecture

8.2. PRACTICAL WORKS Number of hours - 20	Teaching methods	Observation
1. Extraction of elite plants from different species of crop plants.	Samples elite plants	1 laboratory work
2. Extraction and analysis of elite plants in winter wheat.	Wheat plants from different varieties.	1 laboratory work
3. Extraction and analysis of elite plant in soybean.	Soybean plants from different varieties	1 laboratory work
4. Extraction and analysis of elite plants in maize. Analysis of inbred lines, simple, trilinear, and double hybrids and segregating maize generations.	Cobs of maize inbreds and hybrids	1 laboratory work
5. The study of variability within and between different potato cultivars.	Potato tubers of different varieties	1 laboratory work
6. Organization, general and specific works in wheat and corn breeding field trials.	Visit the SCDA Turda	2 laboratory works
7. Organization of cultivars in experimental field trials. Results exploitation in experimental trials of wheat, corn and sugar beet cultivars.	Visit an experimental field trial with wheat cultivars	2 laboratory works
<i>Compulsory bibliography:</i>		
1. MUNTEAN L., 2019/2020 – <i>Notițe de curs</i>		
2. SAVATTI M., G. NEDELEA, M. ARDELEAN, 2004. <i>Tratat de ameliorarea plantelor</i> , Ed. Marineasa, Timișoara		
3. MUREȘAN T., T. CRĂCIUN, 1973, <i>Ameliorarea specială a plantelor</i> , Ed. Ceres, București		
4. SAVATTI M., L. MUNTEAN, 2002, <i>Caiet de lucrări practice la ameliorarea plantelor și producerea de sămânță</i> , Ed. AcademicPres, Cluj-Napoca		

9. Corroborating the discipline content with the expectations of the epistemic community representatives, of the professional associations and of the relevant employers in the corresponding field

In order to identify new ways of modernization and continuous improvement of teaching and course content with the

current issues and practical problems, teachers will participate in the annual session of INCDA Fundulea and National Genetics and Breeding session where together with farmers, debating issues regarding present and future of plant breeding in Romania.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	<ul style="list-style-type: none"> - Knowledge of germplasm necessary for breeding of the main crops. - Knowledge of the particular type of breeding methods used in self-pollinated, cross – pollinated and vegetative propagation plants. - Application of the main methods used to induce the variability in plant breeding. - Application of modern methods in plant breeding: biotechnology, dihaploidy and genetic engineering. 	Exam	75%
10.5. Seminar/Laboratory	<ul style="list-style-type: none"> - Knowledge of the main methods used to study cultivars variability/stability in wheat, corn, sunflower, potato. - Application of modern methods for determining the quality of wheat, corn, soybeans. - Calculation of yield in experimental plots 	Colloquy	25%

10.6. Minimum performance standards

Mastering knowledge transmitted through courses and practical work at an acceptable level. Obtain the pass mark in practical work, attending lectures and tutorials, knowledge of the main breeding methods in self-pollinating and cross-pollinated crops..

- 1 Cycle of studies - choose one of the three options: Bachelor/Master/Ph.D.
- 2 according to the educational plan
- 3 Discipline status (compulsoriness) - choose one of the options - DI (compulsory discipline) DO (optional discipline) DFac (facultative discipline).
- 4 One credit is equivalent to 25-30 hours of study (teaching activities and individual study).

Filled in on
04.09.2019

Course coordinator
Associate prof. dr. Leon MUNTEAN

Laboratory work/seminar coordinator
Assistent prof. dr. Andreea ONA

Approved by the
department on
05.09.2019

Head of the Department
Professor dr. Marcel DUDA