



No. \_\_\_\_\_ of \_\_\_\_\_

USAMV form 0101040103

**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 <sup>1</sup>	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 1						
2.2. Course coordinator				Associate professor Leon MUNTEAN				
2.3. Seminar/ laboratory/ project coordinator				Assistant professor Andreea ONA				
2.4. Year of study	IV	2.5. Semester	I	2.6. Evaluation type	Summative	2.7. Discipline status	Content <sup>2</sup>	DD
							Compulsoriness <sup>3</sup>	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	56	out of which: 3.5. lecture	28	3.6. seminar/laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on books, textbooks, bibliography and notes					35
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					20
3.4.4. Tutorials					-
3.4.5. Examinations					9
3.4.6. Other activities					-
3.7. Total hours of individual study	79				
3.8. Total hours per semester	135				
3.9. Number of credits <sup>4</sup>	5				

**4. Prerequisites (if applicable)**

4.1. curriculum-related	Genetics, Botany, Experimental Design, Physiology, Biochemistry
4.2. skills-related	The student must possess knowledge of the main crops biology, molecular and population genetics and field trial experiments

**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.). Academic discipline and seriousness required throughout the duration of works.

## 6. Cumulated specific competences

Professional competences	<ul style="list-style-type: none"> <li>- To know the specific terminology of plant genetics and plant breeding.</li> <li>- To know the plant genetic resources and their role in the development of the crop plant, its use in plant breeding.</li> <li>- To acquire the methodology of creating genotypic variability and its use in the creation of cultivars, hybrids and clones.</li> <li>- To acquire specific knowledge about GM plants.</li> <li>- To know generalities about the types of cultivars and how to improve their seed production.</li> </ul>
Transversal competences	<ul style="list-style-type: none"> <li>- To be able to develop a program for the collection, study, maintenance and use of plant genetic resources.</li> <li>- To be able to develop research projects of new genotypes (varieties, hybrids, clones) in field trials and demonstration plots.</li> <li>- To be able to organize seed producing farms of corn, sunflower, sugar beet.</li> <li>- To be able to participate in the specific work of plant breeding fields.</li> </ul>

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

7.1. General objective	Acquiring knowledge on creating cultivars and hybrids of field crops and maintaining their biological value.
7.2. Specific objectives	<ul style="list-style-type: none"> <li>- To understand the need of maintaining the germplasm diversity.</li> <li>- To know how to multiply cultivars in order to maintain their purity.</li> <li>- To know the progress in modern breeding, including modern biotechnology.</li> </ul>

## 8. Content

8.1. COURSE Number of hours – 28	Teaching methods	Observation
1. Plant breeding: object, content, stage, perspectives.	Lectures	1 lecture
2. Plant genetic resources: conservation, improvement and their use in plant improvement.	Lectures	1 lecture
3. Genetic variability of the crop.	Lectures	1 lecture
4. Reproductive systems and their importance for plant breeding.	Lectures	1 lecture
5. Male sterility and their use in plant breeding.	Lectures	2 lectures
6. Selection - main method in plant breeding.	Lectures	1 lecture
7. Hybridization.	Lectures	2 lectures
8. Inbreeding and heterosis in breeding of cross-pollinated plants.	Lectures	1 lecture
9. Using mutagenesis to improve.	Lectures	1 lecture
10. Polyploidy and its use in creating cultivars.	Lectures	1 lecture
11. The application of biotechnology in modern cultivars creation.	Lectures	2 lectures

8.2. PRACTICAL WORKS Number of hours – 28	Teaching methods	Observation
1. Stages and composition of breeding process.	Prepare plant breeding scheme	1 laboratory work
2. Time necessary for field and laboratory works in the breeding process.	Visit at SCDA Turda	1 laboratory work
3. Study of variability in cereal crop.	Plants of wheat, barley, oats	1 laboratory work
4. Study of variability in maize.	Corn cobs	1 laboratory work
5. Study of variability in sunflower.	Sunflower capitula	1 laboratory work
6. Study of quality variability in sugar beet.	Sugar beet roots	1 laboratory work
7. Study of quality variability in potato tubers.	Potato tubers	1 laboratory work
8. Hybridization technique in cereal crop.	Plants of wheat and barley,	1 laboratory work
9. Inbreeding and hybridization in maize.	Corn cobs, corn inbreds lines	2 laboratory works
10. Mass selection and repeated mass selection.	Selection scheme	1 laboratory work
11. Pedigree selection.	Selection scheme	1 laboratory work
12. Backcross method.	Backcross scheme	1 laboratory work
13. Methods used in testing plant resistance to biotic and abiotic stress.	Diseased plants of wheat, corn, sunflower	2 laboratory works
<p><i>Compulsory bibliography</i></p> <ol style="list-style-type: none"> <li>1. MUNTEAN L., 2019/2020 – <i>Notițe de curs</i></li> <li>2. SAVATTI M., M. SAVATTI jr., L. MUNTEAN, 2003 – <i>Ameliorarea plantelor – teorie și practică</i>, Ed. AcademicPres, Cluj-Napoca</li> <li>3. MUNTEAN L., 2012, <i>Ameliorarea plantelor – partea generală</i>, Ed. AcademicPres, Cluj-Napoca</li> <li>4. HAȘ I., 2006, <i>Producerea semințelor la plantele agricole</i>, Ed. AcademicPres, Cluj-Napoca</li> </ol>		

**Facultative bibliography:**

1. SAVATTI M., G. NEDELEA, M. ARDELEAN, 2004, *Tratat de ameliorarea plantelor*, Ed. Marineasa, Timișoara
2. \*\*\* *Revista "Cercetări de genetică teoretică și aplicată" ICCPT Fundulea -1971-2008*

**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"><li>- Knowledge of the origin areas of cultivated plants.</li><li>- Aspects of variability creation.</li><li>- Role of pollination type in choosing the breeding processes.</li><li>- Knowledge of the main selection schemes</li><li>- Knowledge of cultivars types</li><li>- Mutations, polyploidy and modern biotechnology in plant breeding</li></ul>	Exam	75%
10.5. Seminar/Laboratory	<ul style="list-style-type: none"><li>- Knowledge of the variability study methods.</li><li>- Knowledge of the methods for determining the quality of sugar beet and potato.</li><li>- Knowledge main selection schemes: the mass, pedigree, seed reserve etc.</li></ul>	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).

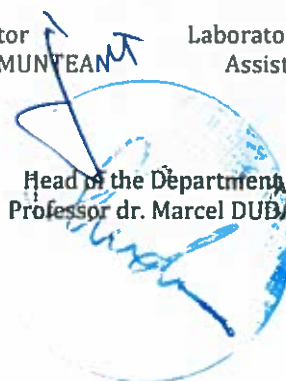
Filled in on  
04.09.2019

Course coordinator  
Associate prof. dr. Leon Munteanu

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

Approved by the  
department on  
05.09.2019

Head of the Department  
Professor dr. Marcel DUBA



*Dana*