

University of Agricultural Sciences and Veterinary Medicine from Iași**Faculty – Agriculture**

Department: Plant sciences

Study domain: Agronomy

Study programme: Agriculture

Approved,**Dean****Prof. PhD Costel SAMUIL****DISCIPLINE FILE****1. Data regarding programme**

1.1. Institution of higher education	University of Agricultural Sciences and Veterinary Medicine from Iași
1.2. Faculty	Agriculture
1.3. Department	Plant sciences
1.4. Study domain	Agronomy
1.5. Study cycle	Bachelor's degree
1.6. Study programme	Agriculture

2. Data regarding discipline

2.1. Name of discipline	Plant breeding						
2.2. Holder of lecture activities	Prof. PhD. Constantin LEONTE						
2.3. Holder of seminar/laboratory activities	Biol. PhD. Elena Ancuța LUPU						
2.4. Year of study	III	2.5. Semester	6	2.6. Evaluation type	E	2.7. Discipline regime	DS/DI

3. Total estimated time (hours per semester)

3.1. Number of hours per week	4	from which: 3.2. lectures	2	3.3. laboratory	2
3.4 Total hours from learning plan	56	from which: 3.5. lectures	28	3.6. laboratory	28
Distribution of time fund					hours
Study after book, textbook, references and notes					30
Additional documentation in library, on specialized electronic platforms and on field					28
Preparation for laboratories, home-works, essays					30
Tutor					-
Examinations					6
Other activities.....					-
3.7. Total hours of individual study					88
3.9. Total hours per semester					150
3.10. Number of credits					5

4. Pre-conditions (where available)

4.1. of curricula	Botany, Plant physiology, Genetics, Experimental technique, Phyto-technique, Phyto-pathology, Entomology
4.2. of competences	Minimal knowledge regarding the main crop species in Romania, basic laws or heredity, genetic structure of populations, examination of biological material, breeding aims, breeding methods.

5. Conditions (where available)

5.1. for lectures	<ul style="list-style-type: none"> Lecture is interactive Attendance at lectures is not compulsory, but will be taken in consideration during evaluation process; Students will not be allowed to have their mobile phones switch on. I will not be tolerated private phone calls during lectures, also they will not be allowed to leave the lecture room for making private phone calls; University conduct impose to respect the starting and finishing hour of the lecture; Recording of lecture by any electronic means will be done only with the permission granted by the lecture holder.
5.2. for seminar/laboratory/project	<ul style="list-style-type: none"> Attendance at practical works is compulsory and impose the access to final evaluation, missed practical works will be totally recovered in according with the schedule listed at the discipline; Will be given partial verification papers which will contribute to the final mark; Will not be tolerated the delay of the students at practical works; At practical works each student will done an individual activity with the

	laboratory materials given and described in practical training book and under the supervision of qualified personnel; • Promoting of the final test it is a condition for entering in the final evaluation.
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6. Accumulated specific competences

Professional competences	<ul style="list-style-type: none"> - Assimilation of information specific to discipline in correlation with the other fundamental and speciality disciplines; - A correct presentation of the assimilated knowledge; - Synthesis ability of knowledge and statistical processing of the experimental data; - Elaboration of some correct and clear conclusions regarding breeding investigations and experiments in field and laboratory; - Proper understanding and utilisation of specific terminology for plant breeding processes; - Field design of specific experiments for plant breeding; - Effectuation of bio-metric observations and determinations on plants and quantitative/qualitative features; - Samples gathering for determination of: productivity, aspects connected with production quality, resistance to illness, pests, drought and low temperatures; - Effectuation of specific operations for forced hybridising (isolation, castration, pollination); - Apply of laboratory methods for analysis of productivity, production quality (determination of starch content at potatoes, determination of wet gluten in wheat, determination of boiling coefficient at leguminous grains etc.) and resistance to illness, pests, drought and low temperatures etc.
Transversal competences	<ul style="list-style-type: none"> - Awareness of importance of achieved knowledge and their dissemination; - Realization of inter-disciplinary logical connexions; - Correct application of specific study and working methods in experimental fields and laboratories; - Awareness of importance of natural biological resources and necessity of their preservation and protection, in according with the nowadays international behaviour, face to those resources; - Utilization and dissemination of the achieved theoretical and practical knowledge, through involving in research grants, in professional organisations, workshops, activities for practical training demonstrations etc.; - Documentation and constant exchange of speciality information.

7. Aims of discipline (in according with the grille of accumulated specific competences)

7.1. General aim of discipline	<p>The main aim is that students to achieve knowledge regarding the targets of plant breeding, biological material sources which could be utilised for realization of those aims and the methods for plant breeding.</p> <p>Practical works aim to familiarize the students with working technique in laboratory, regarding the examination modalities of the utilised biological material during breeding process as well as realization of some specific operations for breeding techniques, in field and in laboratory.</p>
7.2. Specific aims	<ul style="list-style-type: none"> - knowing the categories of initial material, their value for obtaining of new cultivars with agronomical importance and the way in which biological material is gathered, studied and preserved; - knowing of the main aims and breeding methods, conventional and modern, for each group of species (autogamous, allogamous, with vegetative multiplication); - knowing the organizational way for breeding process; - knowing the examination way for biological material during breeding process; - presentation of breeding techniques at main cropping species; - realization of practical operations regarding: extraction of elite plants from field, biometric determinations on elite plants, forced hybridization etc.

8. Contents

8.1. Lectures	Nr. of hours	Teaching methods	Observations
1. INTRODUCTIVE NOTIONS	2		
2. ORGANIZATION OF BREEDING PROCESS	2		
3. VARIABILITY OF BIOLOGICAL MATERIAL	2		
4. AIMS OF PLANT BREEDING 4.1. Definition, classification, factors involved in choosing of plant breeding aims <ul style="list-style-type: none"> 4.1.1. Improvement of yield capacity 4.1.2. Quality improvement 4.1.3. Improvement of resistance to illnesses and pests 4.1.4. Creation of biological material with different precocity époques 4.1.5. Lodging improvement 4.1.6. Winter hardness improvement 4.1.7. Drought tolerance improvement 4.1.8. Creation of sorts and hybrids for intensive crops 	4	Interactive speech, explanations, Power point	

5. GERmplasm UTILISED IN PLANT BREEDING 5.1. Importance, classification, characterization 5.2. Origin and genetic centers 5.3. Gathering, classification, study and preservation of the germplasm	2		
6. CONVENTIONAL METHODS UTILISED IN PLANT BREEDING 6.1. The importance of breeding method choosing 6.2. Clasification and characterisation of conventional methods in plant breeding 6.2.1. Selection 6.2.2. Hybridisation 6.2.3. Inbreeding 6.2.4. Mutagenesis 6.2.5. Poliploidy	14		
7. NON-CONVENTIONAL METHODS UTILISED IN PLANT BREEDING 7.1. Importance of non-conventional techniques 7.2. "In vitro" cultures of cells and tissues 7.2.1. Clone propagation, cloning or micro-propagation 7.2.2. Embryo or ovules cultures 7.2.3. Anthers or ovary cultures 7.2.4. Induction of somaclonal variations 7.2.5. Protoplasts cultures and somatic hybridization 7.3. Genetic transformation 7.3.1. Importance, utilised methods for gene transfer and for trans-genesis confirmation 7.3.2. Applications of trans-genesis in plant breeding 7.4. Molecular markers in plant breeding 7.4.1. Importance and type of molecular markers 7.4.2. Techniques for enlightened of molecular markers 7.4.3. Selection of markers associated with some interest characters in breeding 7.4.4. Applications of molecular markers in plant breeding	4		
TOTAL HOURS OF LECTURES	28		

References (compulsory)

- Leonte C., 2003 – Ameliorarea plantelor, Ed. "Ion Ionescu de la Brad" Iași.
Crețu A., Simioniu D., Crețu L., 2000 – Ameliorarea plantelor, producerea și multiplicarea semințelor și materialului săditor. Ed. "Ion Ionescu de la Brad" Iași.
Leonte C., 1996 – Ameliorarea plantelor horticoale. Ed. Did. și Ped. București.

References (facultative)

- Badea Elena Marcela, 2003 – Plantele transgenice în cultură. Broșură. București.
Cociu V. și colab., 1999 – Progrese în ameliorarea plantelor horticoale din România. Vol. I, Pomicultura. Ed. Ceres, București.
Crețu A., 1995 – Ameliorarea plantelor, producerea și multiplicarea semințelor. Caiet de lucrări practice, Uz intern, U.A.M.V. Iași.
Crețu L., 2004 – Culturi "in vitro". Ed. "Ion Ionescu de la Brad" Iași.
Leonte C., 2011 – Tratat de ameliorarea plantelor. Ed. Academiei, București.
Munteanu N., 2000 – Ameliorarea plantelor ornamentale. Ed. "Ion Ionescu de la Brad" Iași.
Muntean L., 2012 – Ameliorarea plantelor, partea generală. Ed. Risoprint, Cluj-Napoca.
Savatti M. și colab., 2004 – Tratat de ameliorarea plantelor. Ed. Marineasa, Timișoara.
Sestraș R., 2004 – Ameliorarea speciilor horticoale. Ed. AcademicPres, Cluj-Napoca.
Țirdea Gh., 1996 – Genetică. Curs, U.A.M.V. Iași.

8.2. Practical works	Nr. of hours	Teaching methods
Organisation of plant breeding activities in Romania	2	Speech, explanations, demonstrations, case study, documentation visits
Plant breeding fields	2	Speech, explanations, demonstrations, case study, documentation visits
Determination of character variability at autogamous and alogamous plants	2	Speech, explanations, demonstrations, case study
Determination of heritability characters at alogamous plants	2	Speech, explanations, demonstrations, case

		study
Determination of heterosis at alogamous hybrids	2	Speech, explanations, demonstrations, case study
Obtaining and selection of the inbreed lines	2	Speech, explanations, demonstrations, case study
Selection and analysing of elite plants at wheat	2	Speech, explanations, demonstrations, case study
Selection and analysing of elite plants at maize	2	Speech, explanations, demonstrations, case study
Selection and analysing of elite plants at sunflower	2	Speech, explanations, demonstrations, case study
Technique of forced hybridization	2	Speech, explanations, demonstrations, case study
Preservation of germplasm sources	2	Speech, explanations, demonstrations, case study, documentation visits
“In vitro” culture laboratory	2	Speech, explanations, demonstrations, case study, documentation visits
Modern breeding methods	2	Speech, explanations, demonstrations, case study, documentation visits
Testing	2	
TOTAL HOURS OF PRACTICAL WORKS	28	

References (compulsory)

Leonte C., 1997 – Ameliorarea plantelor horticole și tehnică experimentală. Caiet de lucrări practice. Lito, Uz intern, U.A.M.V. Iași.

9. Corroboration of discipline contents with the expectations of community, professional associations and representative employers from the domain connected with study programme

To identify some modern ways for a continuous improving of lecturing and lectures' content, with the most newest themes and practical problems, academic staff participate at Symposium held at Universities of Agricultural Sciences and Veterinary Medicine from Romania, Symposium from research domains held at universities from Romania and abroad and other Societies with activity in the specific domains where have meetings with representative employers and discuss actual problems in the discipline domain.

10. Evaluation

Activity type	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Rate from the final mark
10.4. Lectures	Adequate utilisation of concepts, theories, and basic methods which are specific for Plant breeding	Final examination, writing and oral	40%
10.5. Practical works	- Attendance and active involvement during practical works. - Knowing the main investigation/working methods in field and laboratory, which are specific for Plant breeding	Oral assessment during the semester, verification tests.	60%

11. Minimal performance standards

Minimal requirements (for mark 5): Participation at all laboratory activities; Recovering, maybe with fee, of the lost practical works with groups which have a similar thematic; Minimal knowledge regarding discipline problems; Quite reduced capacity for transferring of information.	Maximal requirements (for mark 10): Active and systemic participation at debates at lectures and practical works; Solid knowledge regarding discipline problems; Capacity for transferring of specialized information Obtain of maximum score to all the above indicators.
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Date

19 sept. 2016

Signature of lectures' holder
Prof. PhD Constantin LEONTE

Signature of seminars' holder
Biol. PhD. Elena Ancuța LUPU

Date of approving in department

Signature of Department director
Prof. PhD. Eugen ULEA