

## DISCIPLINE DESCRIPTION

### 1. Information on the study programme

1.1 Academic institution	UNIVERSITY OF ORADEA
1.2 Faculty	FACULTY OF ENVIRONMENTAL PROTECTION
1.3 Department	FORESTRY AND FOREST ENGINEERING
1.4 Field of study	FORESTRY
1.5 Cycle of study	MASTER
1.6 Study programme/Qualification	SUSTAINABLE RECOVERY OF FOREST RESOURCES / MASTER

### 2. Information on the discipline

2.1 Name of discipline	<b>IMPROVING WOOD SPECIES AMID CHANGES IN GLOBAL CLIMATE CHANGE</b>						
2.2 Course holder	<b>Assoc. Prof. PhD. Lazăr Andra Nicoleta</b>						
2.3 Seminar/Laboratory/Project holder	<b>Lect.PhD.eng. Burescu Laviniu-Ioan-Nuțu</b>						
2.4 Year of study	II	2.5 Semester	3	2.6 Type of evaluation	Ex.	2.7 Regime of discipline	DD

(C) Compulsory; (O) Optional; (E) Elective; (DD) Deepening discipline

### 3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week out of which:	3	3.2. course	1	3.3. laboraty/project	2
3.4 Total hours in the curriculum out of which:	42	3.5. course	14	3.6. laboratory/project	28
<b>Time allotment</b>					<b>hours</b>
Study assisted by manual, course support, bibliography and notes					<b>50</b>
Additional documentation in the library/ on specialised electronic platforms and in the field					<b>50</b>
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					<b>50</b>
Tutorship					<b>2</b>
Examinations					<b>6</b>
Other activities.....					-
<b>3.7 Total hours of individual study</b>					<b>158</b>
<b>3.9 Total hours per semester</b>					<b>42</b>
<b>3.10 Number of credits</b>					<b>8</b>

### 4. Prerequisites (where appropriate)

4.1 curriculum	Prior knowledge of Botany, Genetics and Tree Breeding
4.2 competences	

### 5. Conditions (where appropriate)

5.1. related to course	Video projector, computer
5.2. related to seminar	Laboratory with specific endowments for in vitro micro-propagation, molecular genetics laboratory profiled on PCR analyzes

<b>6. Specific competences acquired</b>	
Professional competences	<p>C1.2 Explain the working principles and efficiency of molecular genetics methods, compared to classical methods, used in the analysis of forest diversity.</p> <p>C1.4 Use of complex criteria and methods to evaluate the results of the analysis of the genetic diversity of forest ecosystems, formulate hypotheses and value judgments and substantiate specific solutions for the management of forest ecosystems.</p> <p>C2.1 Complex interpretation of the principles and laws of forest ecosystems functioning and their interrelationships with agroecosystems and the environment.</p> <p>C4.1 Description of the characteristics of forest ecosystems and climatic phenomena in a global context.</p> <p>C4.3 Use of modern means and methods to research the role of forest ecosystems in limiting the effects of global climate change.</p>
Transversal competences	<p>CT1. CT1 Execution of one's own attributions with professionalism and rigor and making decisions specific to teamwork in accordance with deontological values and principles</p>

**7. Objectives of discipline (coming from the specific competences acquired)**

<b>7.1 General objective</b>	<ul style="list-style-type: none"> <li>- The discipline proposes to the master students an analysis of the global climate changes, as a major factor of global disturbance.</li> <li>- The physiological, genetic and ecological changes that occur in tree species are presented.</li> <li>- The response mechanisms of trees and other plants to changing environmental factors, reconfiguring the area of species and biodiversity on a global scale are identified.</li> <li>- A detailed analysis of the genome and tree propagation strategies used to accelerate the production of new genotypes useful to human society is presented.</li> </ul>
<b>7.2 Specific objectives</b>	<ul style="list-style-type: none"> <li>- Establishing the indicators used in the study of global climate change.</li> <li>- Highlighting the technologies used in the transfer of genetic material to wood species.</li> <li>- Development of tree improvement programs and finding promising solutions for the sustainability of human society</li> </ul>

**8. Content\*/**

8.1 Course	Methods of teaching	No. of hours/ Remarks
1. Global climate change	Interactive lecture	1
2. Procedures and methods used by selection in the improvement of trees and stands	Interactive lecture	1
3. Estimating the effects of selection by determining genetic gain	Interactive lecture	1
4. Calculation of genetic gain, Fundamentals of breeding improvement by J.W. Wright, Calculation of genetic gain or genetic progress (Gallais formula)	Interactive lecture	1
5. The current level of knowledge in genetics	Interactive lecture	1
6. The concept of genetic improvement. Specific terminology. The objectives of genetic improvement	Interactive lecture	1
7. Mutations	Interactive lecture	1

8. Basic notions in tree population genetics	Interactive lecture	1
9. Tree improvement programs: a. phenotype and genotype, b. the genetic code c. Hybridization	Interactive lecture	1
10. Genetic structure of the Panmitian population, Hardy-Weinberg law	Interactive lecture	1
11. Tree improvement programs 1. Use of raw material : Seed plantations with trees from vegetative propagation or micropropagation 2. The concept of plus tree.	Interactive lecture	1
12. Improving Forest trees by selecting valuable populations and seed sources within plantations or seed orchards.	Interactive lecture	1
13. Plus trees for quantity, Plus trees for quality, Plus trees for special criteria, Plus trees for general criteria.	Interactive lecture	1
14. Forest populations within which the selection of plus trees is made.	Interactive lecture	1
<b>Bibliography:</b> 1. Burescu L. „Ameliorarea speciilor lemnoase pe fondul modificărilor schimbărilor climatice globale” , Note de curs, Oradea; 2. Ceapoiu N. 1976 “Genetica și evoluția populațiilor biologice” Editura Academiei Române, București 3. Crăciun T. 1970 “Genetica” Editura Didactică și Pedagogică, București; 4. Drăcea I. 1973 „Genetica” Editura Didactică și Pedagogică, București; 5. Enescu V. 1985 “Genetica ecologică” Editura Ceres, București; 6. Enescu V., Cherecheș D., Bândiu C., 1997 “Conservarea biodiversității și a resurselor genetice forestiere” Editura Agris, București; 7. Pamfil C. 1974 “Genetica” Editura Didactică și Pedagogică, București; 8. Savatti, M.G., 2005. <i>Ameliorarea arborilor forestieri</i> . Ed. AcademicPres, Cluj-Napoca; 9. Savatti M., Andra Ienciu 2003 “Genetica agro-silvică” Editura AcademicPres, Cluj-Napoca; 10. Savatti M., Andra Ienciu, Savatti M. jr. 2004 „Genetica” Editura AcademicPres, Cluj-Napoca; 11. Stănescu V., 1983 “Genetică și ameliorarea speciilor forestiere” Ed. Didactică și Pedagogică București; 12. Șofletea N., 2005 “Genetica și ameliorarea arborilor” Ed. Pentru Viață, Brașov.		
<b>8.3. Laboratory</b>	<b>Methods of teaching</b>	<b>No. of hours/ Remarks</b>
1. Improving trees.	Interactive lecture	2
2. Improving Forest trees.	Interactive lecture	2
3. Use of hybridization in tree breeding.	Interactive lecture	2
4. Hybridization methods.	Interactive lecture	2
5. The technique of forced hybridization to trees.	Interactive lecture	2
6. Selection, the basic method of plant breeding. Natural selection. Artificial selection.	Interactive lecture	2
7. Mass selection.	Interactive lecture	2
8. In vitro cultures of tissues and cells. Their importance in breeding.	Interactive lecture	2
9. Mineral components of the culture medium, Organic components of the culture medium, Phytohormonal components of the culture medium, Physico-chemical characteristics of the culture media.	Interactive lecture	2
10. Trees plus. Age of trees plus. The composition of the trees plus. The area occupied by the trees containing plus trees. Multiplication of plus trees. Testing the genetic value of plus trees. Description of trees plus.	Interactive lecture	2
11. Improving forest trees by creating clonal varieties through vegetative micropropagation. Propagation of trees plus by	Interactive lecture	2

pruning, grafting, pruning, dredging. Clonal multiplication by cuttings.		
12. Clonal multiplication by marking. Clonal multiplication by grafting.	Interactive lecture	2
13. Mutual influences between graft and rootstock. Endogenous rooting inhibitors.	Interactive lecture	2
14. Grafting methods	Interactive lecture	2
<b>Bibliography:</b> 1. Burescu L. „Ameliorarea speciilor lemnoase pe fondul modificărilor schimbărilor climatice globale” , Note de curs, Oradea; 2. Ceapoiu N. 1976 “Genetica și evoluția populațiilor biologice” Editura Academiei Române, București 3. Crăciun T. 1970 “Genetica” Editura Didactică și Pedagogică, București; 4. Drăcea I. 1973 „Genetica” Editura Didactică și Pedagogică, București; 5. Enescu V. 1985 “Genetica ecologică” Editura Ceres, București; 6. Enescu V., Cherecheș D., Bândiu C., 1997 “Conservarea biodiversității și a resurselor genetice forestiere” Editura Agris, București; 7. Pamfil C. 1974 “Genetica” Editura Didactică și Pedagogică, București; 8. Savatti, M.G., 2005. <i>Ameliorarea arborilor forestieri</i> . Ed. AcademicPres, Cluj-Napoca; 9. Savatti M., Andra Ienciu 2003 “Genetica agro-silvică” Editura AcademicPres, Cluj-Napoca; 10. Savatti M., Andra Ienciu, Savatti M. jr. 2004 „Genetica” Editura AcademicPres, Cluj-Napoca; 11. Stănescu V., 1983 “Genetică și ameliorarea speciilor forestiere” Ed. Didactică și Pedagogică București; 12. Șofletea N., 2005 “Genetica și ameliorarea arborilor” Ed. Pentru Viață, Brașov.		

\* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

### 9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

The content of the discipline is in accordance with the current level of knowledge in the field, with the European requirements in the field of modern higher education and anchored in the realities of economic, social and cultural life. The main topics and directions addressed in the university curriculum for Forestry at national and European level are found in the course and laboratory work so as to provide the professional base compatible with the requirements of employers in the European Union and especially in Romania.

### 10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Written exam - Condition for obtaining loans: N > 5	Written exam	80% written exam
10.6. Laboratory			20% laboratory
<b>10.8 Minimum standard of performance</b>			
Knowledge of major disruptors in forest ecosystems, basics in the study of global climate change and in the genetics of tree populations.			

Date of completion

Signature of course holder

Signature of seminar holder

17.09.2020

Conf. univ. dr. biol. **Lazăr Andra Nicoleta**

Șef lucrări dr.ing. Burescu Laviniu

Date of approval in the department

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Signature of the Head of Department

Prof. univ. dr. ing. Timofte Adrian Ioan

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Dean signature

Prof. dr. ing. Chereji Ioan

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\*\* - Name, first name, academic degree and contact details (e-mail, web page, etc.) will be specified.

Conf. dr. Lazăr Andra Nicoleta, [ienciuandra@yahoo.com](mailto:ienciuandra@yahoo.com)