

No. _____ of _____
(discipline code)

USAMV form 0101030215

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	Plants cultivation
1.4. Field of study	Agronomy
1.5. Cycle of study ¹	Bachelor
1.6. Specialization/ Study programme	Agriculture
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name		Crop irrigation						
2.2. Course coordinator				Prof. Dr. Emil Luca				
2.3. Seminar/ laboratory/ project coordinator				Assistant Prof. Dr. Adela Hoble				
2.4. Year of study	III	2.5. Semester	II	2.6. Evaluation type	summative	2.7. Discipline status	Content ²	DS
							Compulsoriness ¹	D O

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					20
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					15
3.4.4. Tutorials					4
3.4.5. Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	64				
3.8. Total hours per semester	120				
3.9. Number of credits ⁴	4				

4. Prerequisites (if applicable)

4.1. curriculum-related	Botany, Pedology, Physiology
4.2. skills-related	Calculus, Graphic representations

5. Conditions (if applicable)

5.1. for the course	The course, which is interactive, is based on modern methods and means of teaching: exposing, explaining and demonstrating the topics, highlighting the practical applications. During the time reserved for the course, is assigned a significant weight of the dialogue, the students having the opportunity to ask questions on the topic. The rules of university conduct established by internal or general regulations will be respected.
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seminar/ laboratory/ project	teacher, on verifying the acquisition of notions and concepts, on forming the skills of solving some practical problems regarding irrigation of plants, drainage of land with excess humidity and soil erosion control. The practical guidance of the discipline will be consulted, when appropriate.
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6. Cumulated specific competences

Professional competences	<p>To become familiar with the specialized language of the discipline;</p> <p>To enter into the details related to soil - water - plant - atmosphere relationships;</p> <p>To understand the role and importance of the physical and hydrophysical properties of the soil in choosing the method of irrigation of agricultural crops;</p> <p>To know the role of each of the factors that determine the need for irrigation of plants: rainfall; temperature; plant - spreading of roots and water extraction; accessibility of water; minimum humidity ceiling;</p> <p>To learn the concepts related to the water consumption of the plants and to become familiar with the methods for determining the water consumption of the plants;</p> <p>To know the main elements of the irrigation regime of plants;</p>
Transversal competences	<p>To participate in the elaboration of some studies to determine the flow of a watercourse in order to establish the water requirement for irrigating an agricultural farm;</p> <p>Be able to choose the most appropriate method of watering an agricultural crop according to the climatic and pedological factors of the area;</p> <p>To participate in training programs in high performing agricultural farms in the area;</p>

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

7.1. General objective	Acquisition of the concepts and concepts related to the irrigation of the plants, the determination of the water supply from the soil and the consumption of water to the plants from the arranged spaces.
7.2. Specific objectives	To be able to draw up a hydraulic sizing project for an irrigation canal or to drain excess water.

8. Content

8.1. COURSE Number of hours -	Teaching methods	Observation
I. The evolution of irrigation works 1.1. The importance of irrigation works; 1.2. History of irrigation works worldwide; 1.3. Development of irrigation works in Romania;	Lecture	1 lecture = 2 hours
II. Soil - water - plant relationships 2.1. Physical properties of soil related to irrigation application: soil texture, soil structure, volumetric weight, specific weight, soil porosity; 2.2. The hydrophysical properties of the soil related to the application of the irrigation of plants: the permeability of the soil for water; soil capillarity; ability to retain water in soil; 2.3. Forms of ground water; 2.4. Factors that determine the need for irrigation of plants: precipitation; temperature; plant - spreading of roots and water extraction; accessibility of water; the minimum humidity ceiling 2.5. Water consumption of plants; Methods for determining the water consumption of plants;	Lecture	2 lectures = 4 hours
III. Irrigation regime 3.1. Watering norm during the vegetation period (Thickness of the soil layer, When applying the watering, Size of the watering norm, Duration or watering time, Watering scheme, Time interval between watering) 3.2. Watering supplies 3.3. Irrigation water needs	Lecture	2 lecture = 4 hours
IV. Water sources and irrigation water quality 4.1. Water sources for irrigation 4.2. Irrigation water quality. Properties of irrigation water 4.3. Irrigation water - a factor for the prevention of soil silting and silting (Causes of secondary silting and soil silting; Measures to prevent secondary silting)	Lecture	2 lectures = 4 hours
V. Watering methods; The factors that determine the choice of the watering method; 3.1. Irrigation by surface runoff; 3.2. Sprinkler irrigation; 3.3. Drip irrigation; 3.4. Irrigation by overflow;	Lecture	2 lectures = 4 hours

3.5. Submersion irrigation; VI. Particularities of irrigated crop technology	Lecture	1 lecture = 2 hours
VII. Irrigation technology and regime for the main agricultural crops 7.1. Irrigation technology and regime for field crops 7.2. Irrigation technology and regime for vegetable crops 7.3. Irrigation technology and regime for fruit crops 7.4. Irrigation technology and regime for vine cultivation	Lecture	4 lecture = 8 hours

8.2. PRACTICAL WORKS / PROJECT Number of hours - 14 / 14	Teaching methods	Observation
I. Methods for determining the elements of the irrigation regime and when to apply watering 1.1. Humidity regime in irrigated soils: soil water reserve; methods for tracking the momentary supply of ground water; 1.2. Soil-water-plant-climate relations; 1.3. Evidence of soil moisture dynamics;	Theoretical presentation of practical works	3 lab work (2 hours/work = 6 hours)
II. Determining the water consumption of crops; 2.1. Direct methods for determining water consumption; 2.2. Indirect methods for determining water consumption; 2.3. Forecast and warning of the application of watering;	Theoretical presentation of practical works	3 lab work (2 hours/work = 6 hours)
III. Watering methods	Theoretical presentation of practical works	3 lab work (2 hours/work = 6 hours)
IV. Calculation of the water requirement of crops	Theoretical presentation of practical works	2 lab work (2 hours/work = 4 hours)
V. Determination of water consumption and irrigation regime for the main agricultural crops 5.1. Determination of water consumption and irrigation regime in field crops 5.2. Determination of water consumption and irrigation regime for vegetable crops 5.3. Determination of water consumption and irrigation regime in fruit crops 5.4. Determination of the water consumption and the irrigation regime for the culture of the vines	Theoretical presentation of practical works	3 lab work (2 hours/work = 6 hours)
<p><i>Compulsory bibliography:</i> Luca E., Z. Nagy, 1999, <i>Irigarea Culturilor, Ed. Genesis, Cluj-Napoca;</i> Luca E., V. Budiu, Ana Ciotlaus, Adela Hoble, 2013, <i>Exploatarea sistemelor de imbunatatiri funciare/ Irigatii, Editia a II-a, Ed. Risoprint, Cluj-Napoca;</i> Oncia Silvica, E. Luca, 2000, <i>Desecări și Drenaje, Editura Alma Mater, Cluj- Napoca;</i> Luca E., Silvica Oncia, 2000, <i>Combaterea Eroziunii Solului, Ed. Alma Mater, Cluj-Napoca.</i></p> <p><i>Optional bibliography:</i> Mureșan D. și colab., 1992, <i>Irigații, Desecări și Combaterea Eroziunii Solului, EDP;</i> Nagy Z., E.Luca, 1995, <i>Irigarea Culturilor, Lucrari practice, Tipo Agronomia ;</i></p>		

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 adequately prepare the future specialists, to put them in contact with concrete situations in the field of preparation, visits will be made to prestigious institutions;

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	The degree of mastery of the notions and concepts related to the irrigation of the plants, the determination of the water supply from the soil and the consumption of water to the plants from the arranged spaces will be tested.	Continuous (VP)	70 %
10.5. Seminar/Laboratory	The degree of preparation will be tested in choosing the most economically efficient watering method, in relation to the specific conditions of an agricultural area.	Two checks are provided	30 %
10.6. Minimum performance standards			
Acquiring an acceptable level of scientific information in the discipline profile. For the promotion, it is compulsory to obtain the minimum passing grade for the ongoing checks.			

- 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
Prof. Dr. Emil Luca

Laboratory work/seminar coordinator
Assistant Prof. Dr. Adela Hoble

Approved by the
department on
05.09.2019

Head of the Department
Prof. dr. Marcel DUDA