

### Biotechnical Faculty / PLANT PRODUCTION / AMELIORATION

<b>Course:</b>	AMELIORATION			
<b>Course ID</b>	<b>Course status</b>	<b>Semester</b>	<b>ECTS credits</b>	<b>Lessons</b> (Lessons+Exercises+Laboratory)
2860	Mandatory	3	6	3+1+1
<b>Programs</b>	PLANT PRODUCTION			
<b>Prerequisites</b>	None			
<b>Aims</b>	To introduce students to the concept and importance of amelioration, land reclamation impact on agricultural production, methods of soil drainage and irrigation			
<b>Learning outcomes</b>	Learning outcomes: After passing this exam student will be able to: - Make a calculation of soil water balance; - Understands Melioration project; - Recognize the causes of soil over moisture; - Estimate the need for drainage; - Assessing how drainage and additional (agro technical) measures applied; - Briefly describe the methods of irrigation; - Calculate the norm of irrigation, irrigation rates and duration of of irrigation; - Provide an argument on the application of appropriate irrigation methods; - Specify the general concepts and basic forms of erosion and land reclamation; - Understands the needs for reclamation in Montenegro			
<b>Lecturer / Teaching assistant</b>	Doc. Mirko Knežević, PhD, Darko Dubak MSc, Miloš Šturanović MSc			
<b>Methodology</b>	Lectures, exercises, preparation of elaborate, consultations, independent work, colloquia and final exam			
<b>Plan and program of work</b>				
Preparing week	Preparation and registration of the semester			
I week lectures	Required data in land reclamation, water and its properties, water regime, hydrological diagram, precipitation, evaporation, infiltration, runoff, project melioration soil-ameliorative study agricultural base, the main project, the project implementation			
I week exercises	Transformation units of water regime.			
II week lectures	Drainage, general characteristics, causes of soil overwetting, influence of drainage on the land and plant, methods of drainage, horizontal drainage.			
II week exercises	Calculation of rainfall intensity and volume of water precipitation			
III week lectures	Basic principles, drainage criteria, basic elements of drainage, materials of drains which are manufactured , facilities on drainage system, construction of drainage			
III week exercises	Test I			
IV week lectures	The open canal network, surface water collection, underground water collection, drainage of surplus water, drainage systems, cleaning and maintenance of canals, objects in the system for drainage, flood control and drainage protected terrain.			
IV week exercises	Calculation of average altitude, average slope of the basin and the density of the river network			
V week lectures	Field visits - visit to ameliorative system			
V week exercises	Application Darcy rules and calculation filtration coefficient			
VI week lectures	Irrigation - general concepts, irrigation norma, irrigation doses, duration of irrigation, importance and needs of plants for water, the effect of irrigation on soil properties, irrigation methods, classification irrigation methods, surface irrigation			
VI week exercises	Colloquium I			
VII week lectures	Irrigation under the pressure, sprinkler irrigation, portable sprinkler irrigation, Self propelled irrigation system, Boom Irrigation Systems			
VII week exercises	Determination of drainage hydromodule and discharge from catchment areas			
VIII week lectures	Irrigation under the pressure, traveling gun irrigation system, center pivot, linear irrigation			
VIII week exercises	Determination of the amount of water to be evacuated from the affected area			
IX week lectures	Trickle irrigation, pulse irrigation, mini- sprinkler irrigation, drip irrigation, subsurface irrigation, fertiga			
IX week exercises	Test II			
X week lectures	Irrigation of agricultural crops, irrigation of field crops, irrigation of vegetables			
X week exercises	Calculation irrigation norma and irrigation doses			

XI week lectures	Irrigation second crop, irrigation of agricultural crops, irrigation of orchards.					
XI week exercises	Calculation of pressure in irrigation system					
XII week lectures	Irrigation of the vineyard					
XII week exercises	Test III					
XIII week lectures	Erosion, General concepts and basic forms, Water erosion - Sheet erosion, Rill erosion, Gully erosion, Stream bank erosion, Interior soil erosion, Irrigation erosion, Calculation of water erosion intensity, Wind erosion					
XIII week exercises	Calculation of the irrigation doses and the maximum allowed sprinklers flow rate					
XIV week lectures	Anti erosion methods, Preventive protection methods, Direct protection methods, Agro technical anti-erosion action, Biological protection methods, Technical methods, Reclamation of damaged agricultural lands, Consumers of agricultural land, Classification					
XIV week exercises	Calculation of the intensity of soil erosion using the formula professors Gavrilovic					
XV week lectures	The land area of Montenegro which require amelioration and their division based on the application for land reclamation, amelioration measures impact on the environment, the opportunities for sustainable development and application in organic agriculture					
XV week exercises	Colloquium II					
<b>Student workload</b>						
<b>Per week</b>			<b>Per semester</b>			
<b>6 credits x 40/30=8 hours and 0 minuts</b> 3 sat(a) theoretical classes 1 sat(a) practical classes 1 excercises <b>3 hour(s) i 0 minuts</b> of independent work, including consultations			Classes and final exam: <b>8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts</b> Necessary preparation before the beginning of the semester (administration, registration, certification): <b>8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts</b> Total workload for the subject: <b>6 x 30=180 hour(s)</b> Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) <b>36 hour(s) i 0 minuts</b> Workload structure: <b>128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)</b>			
<b>Student obligations</b>			Students are required to attend lectures, have completed all exercises, tests and colloquiums			
<b>Consultations</b>			In agreement with the students.			
<b>Literature</b>			Rudić, D.: Melioracije, Poljoprivredni fakultet, Beograd-Zemun, Nemanjina 6 (1999), Rudić, D., Đurović N.: Odvodnjavanje, Univerzitet u Beogradu, Poljoprivredni fakultet, Beograd-Zemun, Nemanjina 6 (2006), Sričević, R.: Navodnjavanje, Univerzitet u Beogradu, Poljoprivredni fakultet, Beograd-Zemun, Nemanjina 6 (2007), Dragović, S.: Navodnjavanje, Naučni institut za ratarstvo i povrtarstvo, Novi Sad (2000), Čorović, R., Jovanović Ž.: Projektovanje melioracionih sistema, Poljoprivredni fakultet, Beograd-Zemun, Nemanjina 6(1992)			
<b>Examination methods</b>			Activity during lectures, prepared and verified exercise and homework - 10 points, tests I - 8 points, Colloquium I - 8 points, Test II - 8 points Test III - 8 points, Colloquium II - 8 points, Final exam -50 points. A passing grade is obtained if at least 50 points are accumulated cumulatively			
<b>Special remarks</b>						
<b>Comment</b>						
<b>Grade:</b>	F	E	D	C	B	A
<b>Number of points</b>	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points