Course Unit Descriptor

Study Programme: Soil, plant and genetics, module: Irrigation of agricultural crops

Course Unit Title: Hidropedology

Course Unit Code: 19.ZB6001

Name of Lecturer(s): Borivoj Pejić, full professor; Ksenija Mačkić, associate professor

Type and Level of Studies: master academic studies

Course Status (compulsory/elective): compulsory

Semester (winter/summer): winter

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 5

Prerequisites: none

Course Aims:

Understanding the principles existing in the system of soil-water-plant.

Learning Outcomes:

Well-trained engineers who can successfully perform irrigation without harmful effects on soil properties.

Syllabus:

Theory

Problems that follow irrigation (water lodging and salinity of soil, leaching, and fertility decrease of the ploughed land, deterioration of soil structure, infiltration decrease, and irrigation erosion). Principles of rational irrigation. Physical properties of the soil (mechanical composition, soil structure, volume, specific mass of the soil, total and differential porosity, density, and plasticity of the soil). Water categories in the soil (chemically bound water, hygroscopic water, film water, capillary water ("a capillary water in narrower sense", "funicular capillary water", contact capillary water, capillary suspended and capillary supported water), gravitation water and soils vapor content). The soils water constants and their use in irrigation (capillary water capacity, field water capacity - 33kPa, "the moisture of the capillary bond interruption", -30kPa, lentocapillary moisture, -625kPa, wilting moisture, -150kPa – initial and permanent, water infiltration, soil permeability, soil moisture characteristics curve (pF), soil air capacity, aeration porosity).

Water availability to plants, optimum level of soil moisture for plants growing, depth of soil wetting (effective root depth), irrigation rate (the irrigation water applied), soil, air, and physiological drought.

Practice

Soil sampling. Determination of physical and water properties of soil, construction of soil moisture characteristics curve (pF), calculation of the amount of water in the soil and irrigation rate, and the use of soil physical and water properties in irrigation practice.

Required Reading:

1. Stewart, B.A. and Nielsen, D.R. (Eds.) (1990). Irrigation of Agricultural Crops. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, Wisconsin, USA.

2. Lascano, R.J and Sojka, R.E. (Eds.) (2007). Irrigation of Agricultural Crops, Second edition. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, Wisconsin, USA.

Weekly Contact Hours:	**Lectures:** 3	**Practical work:** 2

Teaching Methods:

Lectures, practical classes, consultations, research work

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points

Test	10	oral exam	60
Practical exam	30		