

Study Programme: Precision Agriculture		
Course Unit Title: Advance drying and storing technology		
Course Unit Code: 19.PRP023		
Name of Lecturer(s): Ivan Pavkov, Zoran Stamenković		
Type and Level of Studies: Master undergraduated studies		
Course Status (compulsory/elective): Elective		
Semester (winter/summer): winter		
Language of instruction: English		
Mode of course unit delivery (face-to-face/distance learning): distance learning		
Number of ECTS Allocated: 5		
Prerequisites: No		
<p>Course Aims: Introducing students to the basics of advance drying and storage processes, technical solutions and technological procedures for drying and storage of: grains, vegetables, herbs, fruits, vegetables, hops and tobacco, as well as drying and storage technologies on small holdings. Introducing students to the technique of solutions and technology of storing fruits and vegetables in refrigerators and warehouses with controlled and modified atmosphere.</p>		
<p>Learning Outcomes: Enabling students to properly understand technology and equipment for advance drying and storage of various agricultural products. Training for designing technological parameters of drying devices and to project and modeling the processes. Training students to manage and guide the drying and storage process.</p>		
<p>Syllabus: <i>Theory</i> The physical meaning of the drying process. Physical properties of agricultural materials that affect the drying process. Types of drying devices. Grain drying technology. Storage of granular agricultural products: Storage technology, Technical solutions for warehouses and equipment, Fire and explosion protection measures. Automation of drying and storage processes. Drying, processing and storage of seeds: corn, small grains, sugar beet. Drying of fodder plants. Drying and storage of fruits and vegetables. Technical and technological solutions for drying tobacco, hops, medicinal and spice plants. Drying on a small property. Technical and technological solutions for storing fresh fruits and vegetables.</p> <p><i>Practice</i> Laboratory measurements: humidity of biomaterial, impurity content, determination of the presence of GMO organisms, convective drying kinetics, influence of vegetable storage in a controlled atmosphere. Calculation exercises: changes in the state of moist air, single-pass, multi-pass, step drying, partial recirculation. Calculation of heat and material balance of drying and cooling processes. Material balance of grain and seed storage process. Calculation of ventilation and grain cooling. Field trips: two field trips per semester: introduction to the centers for drying and storage of grain material, seeds, fruits and vegetables.</p>		
<p>Required Reading: Carl, Red: Managing stored grain to preserve quality and Value, Kansas State University Manhattan, Kansas, AACC International, 2006, s 235. Chakraverty, Amalendu; Mujumdar, Arun; Raghavan, Vijaya; Ramaswamy, Hosahalli: Handbook of Postharvest Technology, Marcel Dekker, 2003. Kudra, Tadeusz; Mujumdar, Arun: Advanced Drying Technologies, CRC Press, 2009.</p>		
Weekly Contact Hours:	Lectures: 2	Practical work: 2
<p>Teaching Methods: Theoretical classes are conducted with the help of computer presentations and video clips with oral presentation. To support students, the Moodle E-learning system is used, which provides additional opportunities for students to have online access to all information and content for learning. Calculation tasks are done in the exercises with the help of</p>		

teachers and assistants. Laboratory exercises are performed in the laboratory in group work on measuring the required quantities. Visit to the drying and storage facilities.

Knowledge Assessment (maximum of 100 points): 100

Pre-exam obligations	points	Final exam	points
Active class participation		written exam	
Practical work		oral exam	50
Preliminary exam(s)		
Seminar(s)	50		

The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.