

Course Unit Descriptor

Study Programme: Agricultural engineering and information systems		
Course Unit Title: Hydropneumatic engineering		
Course Unit Code: 19.PT1013		
Name of Lecturer(s): Associate Professor Ivan Pavkov, PhD,		
Type and Level of Studies: Undergraduate		
Course Status (compulsory/elective): Compulsory		
Semester (winter/summer): Winter		
Language of instruction: Serbian		
Mode of course unit delivery (face-to-face/distance learning): Face-to-face		
Number of ECTS Allocated: 6		
Prerequisites: None		
<p>Course Aims:</p> <p>The aim of the course is to introduce students with the basics of fluid mechanics, as a basis for hydropneumatic technology, to clarify the concepts and phenomena in statics and fluid dynamics. The second part of the course is dedicated to the study of hydraulic machines, pipelines and associated fittings, the basics of establishing hydropneumatic systems and their components.</p>		
<p>Learning Outcomes:</p> <p>Enabling students to solve simpler hydraulic problems. Recognition of hydropneumatic schemes and the way their main components work. In addition, the student is trained to recognize more complex problems, and to be able to set project tasks for specialists in the field of hydraulics.</p>		
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Basic physical properties of fluids. Hydrostatics. Fluid dynamics. Euler's equation. Continuity equation. Bernoulli's equation. Flow modes. Energy losses during flow through pipelines. Hydraulic machines. Turbomachines. Characteristics of turbomachines. Operation of several hydraulic machines. Volume machines. Motor hydraulic machines. Transmission, control and utilization of hydraulic and pneumatic energy. Hydraulic and pneumatic components and devices.</p> <p><i>Practice</i></p> <p>Calculating tasks from the basic physical properties of fluids. Calculating tasks from fluid statics (hydrostatic pressure measurement, fluid pressure on flat surfaces). Calculating tasks from ideal fluid dynamics. Calculating tasks from real fluid dynamics, energy losses during flow. Calculating tasks from the pipeline. Calculating tasks from turbomachines. Expenditures from the recognition of components of hydropneumatic schemes. Laboratory exercise - determination of fluid density and viscosity (kinematic and dynamic). Laboratory exercise measures the mean fluid flow in a pipeline. Laboratory exercise - determination of Q-H characteristics of turbomachine.</p>		
Required Reading:		
Weekly Contact Hours: 6	Lectures: 3	Practical work: 3

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 teachers and assistants. Three laboratory exercises are performed in the laboratory in group work on measuring the required quantities. Visit to industrial plants, pump and compressor station department.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	30
Practical work	-	oral exam	40
Preliminary exam(s)	20	
Seminar(s)	-		

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