Course Unit Descriptor

Study Programme: Energy and Process Engineering		
Course Unit Title: Fundamentals in Fluid Mechanics		
Course Unit Code: M2051		
Name of Lecturer(s): Maša Bukurov		
Type and Level of Studies: Bachelor level		
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: Introduction to the physical properties of fluids and behavior of fluids at rest and in motion		
Learning Outcomes: Acquisition of knowledge for solving problems in the field liquid and gas at rest and in motion (dimensioning of containers and reservoirs, dimensioning of pipelines, determining flow characteristics).		
Syllabus: The subject and a brief historical development of Fluid Mechanics. General concepts. Physical properties of fluids. Molecular structure - microstructure. The division of physical properties. Pressure. Density. Compressibility. Speed of sound. Viscosity. Surface tension, capillarity and critical pressure. Cavitation. Fluid statics. The hydrostatic pressure. Euler equations for a static fluid. Pressure distribution in liquids and gases in the field of gravity. Fluid pressure on a flat surface. Hydrostatic forces on flat surfaces. Hydrostatic forces on curved surfaces. Buoyancy. Fluid as rigid body under uniform linear acceleration. Fluid as rigid body under rotation. Fluid Kinematics. Dynamics of ideal fluid. Euler equations.Bernoulli integral of Euler equations. Bernoulli equations. Correction factor of kinetic energy. Pipe problems - a form with losses. The coefficient of friction. The method of approximation. Pipeline with turbomachinery, the critical pressure, closed pipeline system. The energy diagram. Complex pipelines. Flow through the holes and sockets. Flow with the variable level. Flow rate measurement.		
Required Reading: Relevant literature in English TBD		
Weekly Contact Hours:3	**Lectures:2**	**Practical work:1**
Teaching Methods: The course is held by using modern equipment (all lectures are done in Power Point), but also by using classical methods – chalk and blackboard. There are a number of movies in fluid mechanics being presented to the students, but also assigned for homework. Objects related to the lectured units are brought to class when possible (pipe elements, measurement instruments). Practice is divided into computing practice (10 weeks) and laboratory (5 weeks). Computing practice accompanies lectures and examination problems are solved on board by gradual display of results. Laboratory practice is held at once for 6 hours, where students carry out experiments and use obtained results to get end results and to draw graphs. Students have to complete practice for homework in order to defend their results and get approval for them at the next laboratory practice class		
Knowledge Assessment (maximum of 100 points):100		

Pre-exam obligations	points	**Final exam**	points
Lecture attendance	5	Oral part of the exam	50
Exercise attendance	2		
Laboratory exercise attendance	3		
Test	10		
Test	10		
Test	10		
Test	10		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			