

Study program:	Undergraduate academic studies - Electrical and Computer Engineering and Mechatronics		
Course title:	Hydraulics and Thermotechnics		
Teacher in charge:	Snežana Dragičević ; teaching assistant Milan Marjanović		
Type of course:	Electrical and computer engineering – Elective; Mechatronics - Mandatory		
ECTS	5		
Prerequisites:	none		
Course objective			
The course provides the necessary level of knowledge for understanding and solving a variety of theoretical and practical problems in the field of hydraulics and thermodynamics and introduces students to physical properties of fluids, basic laws regarding fluids at rest, fluid movement and real problems of fluid flow. In addition, the course gives insight into basic concepts of thermotechnics and energy conversion methods, as well as principles and constraints in the transformation of thermal energy from the point of practical application.			
Learning outcomes			
Students acquire knowledge and step towards understanding physical phenomena and laws of fluids at rest and fluids in motion. The students are trained to solve engineering problems related to fluids at rest and in motion, and understand the ways of heat transformation and the possibility of obtaining the work.			
Course contents			
<i>Theoretical classes</i>			
Physical properties of fluids. Hydrostatics: hydrostatic pressure, Euler s equations, Pascal's law, the force of pressure on flat and curved surfaces, Buoyancy. Kinematics of fluids: basic concepts, modes of fluid flow, Bernoulli's equation, energy losses in the fluid flow. Pumps. The laws of ideal and real gases. Gases laws. The laws of thermodynamics. Energy balances of thermodynamic change of state. Work and heat for cyclic processes.			
<i>Practical classes</i>			
In the context of computational exercises, students are trained to apply their theoretical knowledge in solving practical problems that occur while fluids are still or in motion, with the thermodynamic change of state and cyclic processes. Students are required to implement their own practical assignment using different computational software.			
Literature			
1.	B. Obrović, M. Šašić, Hydraulics, Scientific Book, Belgrade, 1996.		
2.	B. Obrović, Fundamentals of hydraulics, Handbook of solved problems, Scientific Book,1990.		
3.	Ž. Adamović, Lj. Radovanović, Hydraulics and pneumatics, Technical Faculty "M. Pupin", Zrenjanin, 2005.		
4.	M. Bojić, Thermodynamics, Faculty of Mechanical Engineering Kragujevac, 2011.		
5.	S. Dragicević, Thermotechnics – handbook of solved problems, Faculty of Technical sciences Čačak, 2013.		
Number of active teaching hours			
Lectures: 2	Practice: 2	Other forms of classes: -	Other classes: -
Teaching methods			
Frontal teaching, interactive teaching methods, demonstrations, group work. Lectures are conducted in a classroom on the blackboard using presentations, applets and simulations. Calculation exercises are performed on the board and the problems are gradually solved.			
Examination methods (maximum 100 points)			
Exam prerequisites	points	Final exam	points
Homework	20	oral examination	20
Tests	40	written examination	20
Grading system			
Grade	No. of points	Description	
10	91-100	Excellent	
9	81-90	Exceptionally good	
8	71-80	Very good	

7	61-70	Good
6	51-60	Passing
5	less than 50	Failing