

Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / TURBINES

Course:	TURBINES			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12208	Mandatory	3	6	4+2+0
Programs	MECHANICAL ENGINEERING			
Prerequisites	There are no conditions for listening and taking the course			
Aims	The main goal of this course is to get acquainted with theoretical and engineering knowledge in the field of turbines.			
Learning outcomes				
Lecturer / Teaching assistant	Prof. dr Uroš Karadžić Prof. dr Igor Vušanović MsC Vidosava Vilotijević MsC Boris Hrnčić			
Methodology				
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Historical development of turbines and types of hydropower plants and hydraulic machines.			
I week exercises	Types of hydropower plants and hydraulic machines			
II week lectures	Utilization of water energy and basic parameters of turbines. Classification of turbines.			
II week exercises	Utilization of water energy and basic parameters of turbines.			
III week lectures	Constructive forms of hydraulic turbines.			
III week exercises	Classification of turbines.			
IV week lectures	Theoretical foundations of hydraulic turbines and velocity triangles.			
IV week exercises	Velocity triangles			
V week lectures	Similarity Laws for turbines			
V week exercises	Similarity Laws for turbines			
VI week lectures	Cavitation in hydraulic turbines: Concept and types of cavitation and permissible suction height.			
VI week exercises	Cavitation in hydraulic turbines and permissible suction height.			
VII week lectures	Operating characteristics of hydraulic turbines and flow parts of turbines.			
VII week exercises	calculation of the basic parts of the turbine			
VIII week lectures	Selection of the turbine when designing the HPP. Automation, assembly and exploitation of hydraulic turbines.			
VIII week exercises	colloquium			
IX week lectures	Basic concepts of heat turbines and basic schemes of thermal power plants			
IX week exercises	Calculation of the basic schemes of thermal power plants			
X week lectures	Efficiency and steam consumption of the back pressure turbine			
X week exercises	Calculation of efficiency and steam consumption of the back pressure turbine			
XI week lectures	The principle of operation and basic diagrams of the flow path of the turbine			
XI week exercises	Calculation of basic diagrams of the flow path of the turbine			
XII week lectures	Action and reaction turbines			
XII week exercises	Calculation of action and reaction stages of the turbine			
XIII week lectures	Open and closed cycle gas turbine plants			
XIII week exercises	Calculation of open and closed cycle gas turbines			
XIV week lectures	The specificity of using gas turbines and cogeneration systems			
XIV week exercises	Calculation of the scheme of the cogeneration plant			
XV week lectures	Basics of exploitation of steam and gas turbines			

XV week exercises		Calculation of operational parameters of steam and gas turbines				
Student workload						
Per week		Per semester				
6 credits x 40/30=8 hours and 0 minuts 4 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises 2 hour(s) i 0 minuts of independent work, including consultations		Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)				
Student obligations		Students are required to regularly attend classes and exercises, complete project assignments and do all colloquiums				
Consultations		2 times a week				
Literature						
Examination methods		Class attendance: 5 points And colloquium: 15 points II colloquium: 15 points III colloquium: 15 points IV colloquium: 15 points Project assignment: 15 points Final exam: 20 points Total: 100 points A passing grade is obtained if at least 50 points are accumulated cumulatively				
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points