

Faculty of Mechanical Engineering / MECHANICAL ENGINEERING / PUMPS, VENTILATORS AND TURBO COMPRESSORS

Course:	PUMPS, VENTILATORS AND TURBO COMPRESSORS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
12203	Mandatory	2	6	3+2+0
Programs	MECHANICAL ENGINEERING			
Prerequisites				
Aims				
Learning outcomes	1. Determine the basic operating parameters of pumps, fans and turbocompressors, 2. They define the permissible suction height of the pumps, 3. Calculate the coupling of one turbomachine in a plant with branched and non-branched sections, 4. Calculate the regular connection of pumps and fans of the same and different characteristics, 5. Calculate the parallel connection of pumps and fans of the same and different characteristics, 6. Regulate the operation of pumps, fans and turbocompressors, 7. Dimensioning of individual components of pumps, fans and turbocompressors.			
Lecturer / Teaching assistant	Prof.dr Uroš Karadžić MsC Vidosava Vilotijević			
Methodology				
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	General terms for turbomachines.			
I week exercises	Numerical problems from lectures			
II week lectures	Pump head. Pipe equation			
II week exercises	Pump head.			
III week lectures	Theoretical foundations of turbomachines.			
III week exercises	Pipe equation			
IV week lectures	Current parameters of the impeller of turbomachines.			
IV week exercises	Numerical problems from lectures			
V week lectures	Basic operating parameters of turbomachines.			
V week exercises	Numerical problems from lectures			
VI week lectures	Theoretical working characteristics.			
VI week exercises	Numerical problems from lectures			
VII week lectures	Velocity triangles			
VII week exercises	Velocity triangles			
VIII week lectures	Operational properties of turbomachines: similarity laws.			
VIII week exercises	Similarity Laws			
IX week lectures	Operational properties of turbomachines: Cavitation properties of pumps.			
IX week exercises	Cavitation and permissible suction height.			
X week lectures	Operating modes of individual pumps and fans in the plant.			
X week exercises	Operating modes of individual pumps and fans in the plant.			
XI week lectures	Operating modes of pumps and fans in a multi-unit plant.			
XI week exercises	Operating modes of pumps and fans in a multi-unit plant.			
XII week lectures	Regulation of pumps and fans.			
XII week exercises	Regulation of pumps.			
XIII week lectures	Centrifugal pumps. Axial pumps. Diagonal pumps.			
XIII week exercises	Regulation of fans.			
XIV week lectures	General concepts and theoretical foundations of turbocompressors.			

XIV week exercises	Numerical problems from lectures					
XV week lectures						
XV week exercises	Numerical problems from lectures					
Student workload						
Per week			Per semester			
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises 3 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						
Consultations						
Literature			[1] Mrkić, M: Turbomašine pumpe, Univerzitet Crne Gore, Podgorica, 2001. [2] Mrkić, M., Macanović, M: Turbomašine pumpe i ventilatori, Zbirka riješenih zadataka, UCG, Podgorica,1998 [3] Protić, Z., Nedeljković, M: Pumpe i ventilatori, Problemi rešenja teorija, Mašinski fakultet Univerziteta u Beogradu, Beograd, Srbija, 2006. [4] Gajić, A., Pejović, S: Turbomašine, ilustrativni i ispitni zadaci, Mašinski fakultet Univerziteta u Beogradu, Beograd, SR Jugoslavija, 1993. [5] Gulich,F.J: Centrifugal pumps, Springer-Verlag, Germany, 2008. [6] Brennen, E.C: Hydrodynamics of pumps, Oxford University Press,UK, 1994.			
Examination methods						
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