

Add. 3		Course program for the first, second and third level (cycle) of studies			
1.	Course title	Basics of turbomachines			
2.	Code	252			
3.	Study group(s)	HEWM, ACS, TE, EE			
4.	The organizer of the study program (unit, institute, department)	Faculty of Mechanical Engineering - Skopje, Ss. Cyril and Methodius University in Skopje			
5.	Level (first, second, third)	First			
6.	Academic year / semester	summer	7.	ECTS credits	6
8.	Instructor	prof. d-r Predrag Popovski			
9.	Prerequisites	Fluid Mechanics – passed Mathematics 2 - passed			
10.	Course objectives (competences): Study of the principles and theoretical basics of the design and performance characteristics of the turbomachines (pumps and turbines). Introduction to methods for prediction the flow through turbomachines, operational performances. Types of turbomachines design and working conditions in the systems. Ability to solve simple practical problems in the selection of the type and characteristics of the hydraulic turbomachines and theoretical bases for attending of higher courses.				
11.	Course content: Basic concepts and types of the hydraulic turbomachines, flow fundamentals and energy exchange equation. Performances of the turbomachines, equations for similarity, efficiency. Methods for prediction the flow through the turbomachines. Cavitation and cavitation characteristics. Model testing and scaling of the model characteristics . Centrifugal and axial pumps, design characteristics, operational performances and selection conditions.				
12.	Study methods: interactive lectures, auditory practice and/or laboratory practice, self running and/or team work projects, self learning				
13.	Total hours	6 ECTS x 30 hours = 180 hours			
14.	Hours allocation per activity:	30 + 45 + 30 + 15 + 60 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures	30 hours	
		15.2.	Lab (student work)	45 hours	
16.	Project Work/Assignments	16.1.	Project assignments	30 hours	
		16.2.	Individual assignments	15 hours	
		16.3.	Self-study	60 hours	
17.	Points/Marks:				
	17.1.	Tests			80 points
	17.2.	Projects			10 points
	17.3.	Attendance			10 points
18.	Grading scale	Under 50		5 (five) (F)	
		51 - 60 points		6 (six) (E)	
		61 - 70 points		7 (seven) (D)	
		71 - 80 points		8 (eight) (C)	
		81 - 90 points		9 (nine) (B)	
		91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam	Fulfilled activity 17.2 and 17.3			
20.	Language of Instruction	Macedonian			
21.	Course evaluation	Student questionnaire			
22.	Textbooks				

		Instruction materials				
		No.	Author	Title	Publisher	Year
22.1.	1.	Поповски П.	Хидраулични Турбомашини	Печатени предавања	2009	
	2.	Гајиќ А. Крсмановиќ Љ.	Основи турбомашина	Научна књига Белград	2006	
	3.	Бабиќ М.	Збирка задатака из турбомашина	Научна књига Белград	2004	
		Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
22.2.	1.	Ристиќ М.	Пумпе и пумпне станице	Научна књига Белград	2002	
	2.	Мркиќ М.	Турбомашине - пумпе	МФ - Подгорица	2004	