

Add. 3		Course program for the first, second and third level (cycle) of studies			
1.	Course title	Exploitation and objects and systems management			
2.	Code	144			
3.	Study group(s)	TE			
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	Vasko Sharevski			
9.	Prerequisites	no			
10.	Course objectives (competences): Exploitation and management of the objects and systems in their life cycle, energy characteristics of objects and systems, energy efficiency, optimal performances on the basis of techno-economic criteria; balancing and regulation.				
11.	Course content: Life cycle of thermal systems and objects; quality assurance system, commissioning process, life cycle stages of systems and objects, energy efficiency of objects and HVC systems; design, construction, testing and commissioning of the HVC systems; balancing and regulation of HVC systems; inspection; periodical reviews; management during exploitation				
12.	Study methods: Interactive lectures, exercises auditory and / or laboratory, individual and / or team work project tasks, self-learning.				
13.	Total hours	6 ECTS x 30 = 180 classes			
14.	Hours allocation per activity:	30 + 30 + 30 + 30 + 60 = 180 classes			
15.	Lectures/Lab	15.1.	Lectures	30	
		15.2.	Lab (student work)	60	
16.	Project Work/Assignments	16.1.	Project assignments	30	
		16.2.	Individual assignments	30	
		16.3.	Self-study	30	
17.	Points/Marks:				
	17.1.	Tests			70 points
	17.2.	Projects			20 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	no			
20.	Language of Instruction	Macedonian language			
21.	Course evaluation	Surveys and other forms of continuous evaluation			

22.	Textbooks				
22.1.	Instruction materials				
	No.	Author	Title	Publisher	Year
	1.	M.Sharevski, V.Sharevski	Exploitation and management of buildings and systems Експлоатација и менаџмент на објекти и системи - предавања	MFS	2010
	2.	R. Vucetic	Balancing pipe networks in HVAC systems	SMEITS	2002
	3.	G.Sieve, D.Fontaine	Building Commissioning	TECHBrifcs	2008
22.2.	Supplemental Instruction Materials				
	No.	Author	Title	Publisher	Year
	1.	AABC Commissioning Group	ACG Commissioning Guideline	Washington DC	2005
	2.	ACG Commissioning specification	Commissioning of HVAC		2003
	3	Bilding Commissioning Asociation	Commisioning Requirements	ASHRAE Guideline	2005