

Add. 3		Course program for the first, second and third level (cycle) of studies			
1.	Course title	Thermal power plants			
2.	Code	309			
3.	Study group(s)	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	Winter	7.	ECTS credits	6
8.	Instructor	Slave Armenski			
9.	Prerequisites	no			
10.	Course objectives (competences): Characteristics of the energy systems; types of power plants; energy indicators and methods of cycles analysis; fundamental elements of power plants; fuel and water supply; equipment for ash and slag removal; flue gases treatment and take away equipment; choice of site for power plant location; design, construction and power plants exploitation				
11.	Course content: BASIC DATA: Thermal power plants classification. Thermal and technological schemes of thermal power plant. HEAT ECONOMY AND ENERGY INDICATORS of TPP: Coefficients of efficiency: steam turbine plant, thermal power plant-gross and net. Heat balance of the TPP. Consumption of steam, heat and fuel. STEAM PARAMETERS of TPP: Heat economy dependence. Schemes and data of TPP with secondary reheat of steam. FEED WATER REGENERATIVE HEATING: Steam and heat consumption, coefficients of efficiency, types of feed water heating. ELEMENTS of TPP: Steam turbine plants, gas turbine plants, condensers, feed water de-aeration, water tanks, feed water heaters, feed water pumps, fans and air compression systems, systems for feed and cooling water supply, systems for fuel supply. TPP and ENVIRONMENT: Air pollution, emissions of pollutants, plants and equipments for environment protection from harmful substances from TPP. LOCATION OF TPP: Choosing of location site and making general plan-schedule equipment. TPP FOR COMBINED HEAT AND POWER PRODUCTION: Basic data of cogeneration, technologies for cogeneration, cogeneration of thermal power plants with a single, double and triple cycle, heat regeneration steam generation, combined TPP for tri-generation. NUCLEAR POWER PLANT: Basic data of nuclear energy. Utilization of heat from nuclear reactor. Types of nuclear reactors. Safety and protection of NPP..				
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 hours			
14.	Hours allocation per activity:	30 + 30 + 30 + 30 + 60 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures	30	
		15.2.	Lab (student work)	30	
16.	Project Work/Assignments	16.1.	Project assignments	30	
		16.2.	Individual assignments	30	
		16.3.	Self-study	60	
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				
	Instruction materials				
	No.	Author	Title	Publisher	Year
22.1.	1.	K. Dimitrov	Thermal Power Plant printed lectures		2003
	2.	S. Armeniski	printed lectures		2010
	3.	В. А. Рышкин	Тепловые электрические станции	Энергия	1976
	Supplemental Instruction Materials				
22.2.	No.	Author	Title	Publisher	Year
	1.	J.W. Wright, G.W.Moy	Steam Power Plant		2004
	2.	Rolf Kohlhofer	Combined-Cycle Gas and Steam Power Plant		1997
	3	Thomas Elliot, Kao Chen, Robert C. Swanekamp	Standard Handbook of Power plant Engineering 2 nd edition		