Add. 3		Course program for the first, second and third level (cycle) of studies			
1.	Course title	Optimization of energetic systems			
2.	Code	242			
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	summer	7.	ECTS credits	6
8.	Instructor	prof. d-r Atanasko Tuneski			
9.	Prerequisites	Energy production and ecology - signature			
10.	Course objectives (competences): The study of energy-exploitation characteristics of the electricity systems, the consumer analysis and the electrical energy sources, analytical functions for plant preparation, specification and solving of problem of optimal unit commitment.				
11.	Course content: Electricity consumers. Daily load diagram and duration curve. Daily load diagram division. Approximation of the load duration curves. Electricity sources. Hydropower plants (hydrogram and flow duration curve, a simplified global model of the hydropower plant, energetic characteristics of the hydro-aggregate). Thermal power plant (steam thermal power plant, gas turbine thermal power plant, thermal power plants with combined cycle, basic energy characteristics of the thermal power plants). Reserves of the production capacities. Exploitation of the power systems and reliability. Functions for operational planning of the plant production. Real time control functions in the plant operation. Analysis and control of the plant. Calculation of reserve production capacity (reserve regulation, spinning accident reserve, overhaul reserve, power reserve). Power balance (expenditure side, revenue side), annual energy balance, balance of electric power. Plan developing for fuel procurement and costing. Economic aspects of the exploitation of the power systems (specification of the general problem of unit commitment, the solution of the problem for optimal unit commitment).				
12.	Study methods: Interactive lectures, laboratory exercises, exercises, independent and/or team work on project tasks, independent learning				
13.	Total hours	6ECTSx30 classes = 180 hours			
14.	Hours allocation per activity:	30 + 30 + 30 + 30 + 60 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures		30 hours
		15.2.	Lab (student work)		30 hours
16.	Project Work/Assignments	16.1.	Project assignments		30 hours
		16.2.	Individual assignments		30 hours
		16.3.	Self-study		60 hours
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	Accomplished 16.1			
20.	Language of Instruction	Macedonian			
21.	Course evaluation	Student questionnaire			

22.	Textbooks	
	22.1.	Instruction materials

		No.	Author	Title	Publisher	Year
		1.	Milan S. Calovic, Andrija T. Saric	Eksploatacija elektroenergetskih sistema	Beopress, Beograd	1999
		2.	Milan S. Calovic, Andrija T. Saric	Zbirka resenih zadataka iz eksploatacije elektroenergetskih sistema	Beopress, Beograd	1999
		3.	Lj.Krsmanovic	Optimizacija rada elektroenergetskog sistema	Gradjevinska knjiga, Beograd	1986
	22.2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.				
		2.				