

Add. 3		Course program for the first, second and third level (cycle) of studies			
1.	Course title	Process technique			
2.	Code	283			
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	
8.	Instructor	Risto Filkoski			
9.	Prerequisites	Thermodynamics			
10.	<p>Course objectives (competences):</p> <p>Purpose of the course program (competences):</p> <p>Introduction to basics of thermal processes, thermal devices and equipment in different industries: energy, food industry (dairy industry, confectionary industry, processing and preservation of fruits and vegetables, meat industry, etc.). Textile industry, chemical industry, petrochemical industry, pharmaceutical industry, beverage industry, refractory materials industry, insulation materials industry, metallurgy and so on.</p> <p>Acquiring knowledge about the different types of thermal and structural performance devices. Capability to assess the efficiency of industrial furnaces, thermal analysis processes, setting material and heat balance.</p>				
11.	<p>Course content:</p> <p>Introductory section on thermal processes in various industries. Energy sources. Heat carriers. Theoretical fundamentals of fluid mechanics and heat and mass transfer. Classification of thermal processes and devices. Methodology for aerodynamics, thermal and strength calculation. Presentation of various types of thermal devices, design features and calculation. Design of thermal devices and installations for high-temperature processes. Material and energy balance. Principles of waste energy utilization and environmental aspects of the operation of industrial ovens (furnaces).</p>				
12.	Study methods: : lectures, exercises, preparation of seminar and project work, practical classes				
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	2 x 40 = 80 points		
	17.2.	Projects	14 points		
	17.3.	Attendance	6 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	Delivered, presented and positively evaluated seminar work			
20.	Language of Instruction	Macedonian language			
21.	Course evaluation	Survey			

22.	Textbooks				
	Instruction materials				
	No.	Author	Title	Publisher	Year
22.1.	1.	R.V. Filkoski	Thermal devices, Script	Faculty of Mech. Eng., Skopje	2011
	2.	M. Antić i dr.	Thermal engineer, Book 2, Industrial furnaces	Poslovna politika, Beograd	1992
	3.	B.M. Jacimovic, S.B. Genic	Thermal processes and appliances	Faculty of Mech. Eng., Belgrade	2004
	Supplemental Instruction Materials				
	No.	Author	Title	Publisher	Year
22.2.	1.	Group of authors	The Steam and Condensate Loop	Spirax Sarco Co., ISBN 978-0-9550691-3-0	2007
	2.	R.V. Filkoski	Industrial furnaces – solved examples (working version)	Faculty of Mech. Eng., Skopje	2011