Attachment no. 3	**Course program of the first, second and third cycle of studies**				
1.	Subject	**MODELLING AND OPTIMISING IN FOOD TECHNOLOGY**			
2.	Code	**ITHN - 19**			
3.	Study Program	***Innovative technologies for food and nutrition***			
4.	Study Program organized	Faculty of Technology and Technical Science- Veles			
5.	Degree of study	PhD			
6.	Academic year/ semester	1 / II	7.	Number of EKTC credits	5
8.	Professor	Prof. d-r. Vesna Antoska Knights			
9.	Precondition for taking the subject	Postgraduate studies completed			
10.	**Objectives/Competence:** To provide knowledge about mathematical modelling of processes and equipment in food technology, and to become acquainted with the principles of optimisation with a special emphasis on economic optimisation of processes.				
11.	**Program Content:** Introduction to mathematical modelling. Building models. Classification and use of mathematical models. Formulation of the mathematical model. Treatment of engineer data. Analysis and simulation of processes. Elements of Reaction Engineering. Processes and equipment in the food industry. Dimensioning of equipment. Optimisation of processes in the food industry. Optimisation methods. Economic optimisation of processes.				
12.	Methods of learning: Lectures, interactive classes, project assignments, presentations, teamwork, independent preparation and defense of a project assignment.				
13.	Time fund	5 x 30 = 150 hours			
14.	Time distribution	20+10+20+50+50=150			
15.	Teaching activities	15.1.	Lectures - Theory	20 hours	
		15.2.	Exercises (Laboratory, audio), Seminars, Team work	10 hours	
16.	Other forms of activities	16.1.	Projects	20 hours	
		16.2.	Independent tasks	50 hours	
		16.3.	Home learning	50 hours	

17.	Way of estimation the results		
	17.1.	Tests/oral exam	60 points
		Seminars/ Project (presentation: written and oral)	40 points
	17.3.	Activity/Participation in discussions	points
18.	Evaluation Criteria (points/ grades)	Up to 50points	5 (five) (F)
		From 51 to 60 points	6 (six) (E)
		From 61 to 70 points	7 (seven) (D)
		From 71 to 80 points	8 (eight) (C)
		From 81 to 90 points	9 (nine) (B)
		From 91 to 100 points	10 (ten) (A)
19.	Precondition for going to final exam	Seminar	
20.	Language of teaching	Macedonian, English	

22. References

22.1. References (obligatory)

No.	Author	Title	Publisher	Year of publishing
1.	Richar Turton, Richard C.Baillie, Wallace B.Whiting, J.Shaeiwitz	Analysis, Synthesis and Design of Chemical Processes 4th Edition	Prentice Hall PTR, New Jersey	2012
2.	Tijskens, L.M.M.; Hertog, M.L.A.T.M.; Nicolaď, B.	M "Food Process Modelling".	Woodhead Publiching Ltd, Cambridge	2001
3.	LuenbergerDavid G.	Linear and Nonlinear Programming	2nd Edition, Springer	2003

References (additional)

No.	Author	Title	Publisher	Year of publishing
1.	Edited by: Tijskens, L.M.M.; Hertog, M.L.A.T.M.; Nicolaď, B.M.	*Food Process Modelling*.	Woodhead Publishing	2001

	22.2.		Ed.: H.N. Teodorescu, A. Kandel, L.C. Jain.	*Soft Computing in human-related sciences*,	T. J. Ross, Fuzzy Logic with Engineering Applications, 2nd Ed., Wiley	2004
		3.	Koh, Eunsook T., Owen, Willis L.	Introduction to Nutrition and Health Research	Springer	2001