

Attachment no. 3		Course program of the first, second and third cycle of studies			
1.	Subject	MODELLING AND OPTIMISING IN NUTRITIONISM			
2.	Code	ITHN - 30			
3.	Study Program	<i>Innovative technologies on food and nutrition</i>			
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 EKT credits	5
8.	Professor	Prof. d-r. Vesna Antoska Knights			
9.	Precondition for taking the subject	Postgraduate studies completed			
10.	<p>Objectives/Competence:</p> <p>In carrying out experimental and analytical research, as well as the application of scientific methods, knowledge of the sources for obtaining information and data is needed; ways of collecting information from experimental research and their processing; A mathematical approach for analysing data, creating a mathematical model, and its basics. Optimisation methods. Overview of software optimization, linear programming and analysis. Presentation of the results and discussion.</p>				
11.	<p>Program Content:</p> <p>Basics of Optimization methods. Data collection from world Health Organization recommendations, application of software for creation of databases of energies and nutritional composition of groceries, required for calculation of optimization. Graphic method, basics of linear programming, simplex method. Pareto optimization. Reviewed Software Optimization. Analysis of the results obtained.</p>				
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
	1.	Richar Turton, Richard C.Baillie, Wallace B.Whiting, J.Shaeiwitz	Analysis, Synthesis and Design of Chemical Processes 4 th Edition	Prentice Hall PTR, New Jersey
	2.	Tijskens, L.M.M.; Hertog, M.L.A.T.M.; Nicolad', B.	M "Food Process Modelling".	Woodhead Publishing Ltd, Cambridge
	3.	LuenbergerDavid G.	Linear and Nonlinear Programming	2nd Edition, Springer
22.2.	References (additional)			
	No.	Author	Title	Publisher
	1.	Edited by: Tijskens, L.M.M.; Hertog, M.L.A.T.M.; Nicolad', B.M.	<i>Food Process Modelling.</i>	Woodhead Publishing
		Ed.: H.N. Teodorescu, A. Kandel, L.C. Jain.	<i>Soft Computing in human-related sciences,</i>	T. J. Ross, Fuzzy Logic with Engineering Applications, 2nd Ed., Wiley
	3.	Koh, Eunsook T., Owen, Willis L.	Introduction to Nutrition and Health Research	Springer