

Attachment no. 3		Course program of the first, second and third cycle of studies			
1.	Subject	BIOCHEMISTRY OF IMPORTANT COMPOUNDS IN FOOD			
2.	Code	ITHN-08			
3.	Study Program	<i>Innovative technologies on food and nutrition</i>			
4.	Study Program organized	Faculty of Technology and Technical Science- Veles			
5.	Degree (first, second, third cycle)	Phd			
6.	Academic year/ semester	1 / II	7.	Number of EKT credits	5
8.	Professor	Prof. d-r. Valentina Pavlova Prof. d-r. Gorica Pavlovska			
9.	Precondition for taking the subject	Postgraduate studies completed			
10.	<p>Objectives/Competence:</p> <p>Based upon previous knowledge of Biochemistry, the student will upgrade his/her knowledge by studying the role of proteins, enzymes, lipids, carbohydrates, vitamins and minerals in human metabolism. During this course the importance of certain vitamins and minerals in the prevention of various diseases has been evaluated. The student will build a skill to distinguish the macronutrients and micronutrients in food and their frequency in a complete meal. The student will be capable to explain biochemical and nutritional significance of proteins, enzymes, lipids, carbohydrates, vitamins and minerals in the diet; and when the using of nutritional supplements is justifying.</p>				
11.	<p>Program Content:</p> <p>Fundamentals of biochemistry. Water. Amino acids, peptides, proteins. Enzymes. Carbohydrates. Lipids. Bioenergetics and metabolism of proteins, enzymes, lipids, carbohydrates. Importance of vitamins and minerals in proper nutrition. Vitamin A: Absorption and metabolism of vitamin A and carotenoides, nutritional status, deficiency, retinol and retinaldehyde in the visual cycle. Vitamin D and its vitamers: metabolic function, cholecalciferol photosynthesis in the skin, metabolic regulation, calcitriol, parathyroid hormone, deficiency (rickets and osteomalation).</p>				

	<p>Vitamin E: tocopherols and tocotrienols, antioxidant function, vitamin E function in cellular signaling. Vitamin K: metabolism (carboxylases, blood clotting proteins, osteocalcin, cell signaling), deficiency and nutritional significance. Group B vitamins: thiamine, riboflavin, niacin, folate and pantothenic acid, pyridoxale, cobalamine, metabolism, deficiency and nutritional significance. Vitamin H: the role of biotin in the reaction of carboxylation, deficiency during pregnancy. Vitamin C: metabolism (intestinal absorption and excretion, oxidation and reduction of ascorbate). Minerals: A review of the ions in a human organism. Importance of health, transport of ions Na^+, K^+, Ca^{2+}, Mg^{2+}, Zn^{2+}, Fe^{2+} and Fe^{3+}. Metabolism of ions, a mechanism for maintaining the concentration of ions in the body. Biochemical function and nutritional significance of minerals in food and nutrition. Recommended RDA values.</p>			
12.	Methods of learning: audiovisual			
13.	Time fund	150 hours		
14.	Time distribution	50+30+30+10+30 = 150		
15.	Teaching activities	15.1.	Lectures - Theory	50 hours
		15.2.	Exercises (Laboratory, audio), Seminars, Team work	30 hours
16.	Other forms of activities	16.1.	Projects	30 hours
		16.2.	Independent tasks	10 hours
		16.3.	Home learning	30 hours
17.	Way of estimation the results			
	17.1.	Tests/oral exam	80 points	
	17.2.	Seminars/ Project (presentation: written and oral)		10 points
		Activity/Participation in discussions		10 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.	Literature				
	Compulsory literature				
	Number	Author	Title	Publisher	Year of publishing
22.1.	1.	David L. Neison & Michael M. Cox	Ленинџер принципи на биохемија	4th Edition, W. H. Freeman & Co, (превод Влада)	2004
	2.	Alexander C. Brownie & John C. Kernohan	Медицинска биохемија	2nd Edition, Elsevier (превод Влада)	2005
	3.	David A. Bender	Nutritional Biochemistry of the Vitamins	2 ed., Cambridge University	2003

			Reference Manual, Standardized Language for the Nutrition Care Process		
	Additional literature				
	Number	Author	Title	Publisher	Year of publishing
22.2.	1.	Bender, D.A.	Introduction to nutrition and metabolism	UCL Press, London	1993
	2.	Berg, J.M., Tymoczko, J.L., Stryer, L.	Biochemistry	5.ed., W.H. Freeman & Co., New York	2004
	3.	H. Tamura, S. Ebeler, K. Kubota, J. Takoka	Вкусот на храната: Хемија, сетилна евалуација и биолошка	Oxford University Press, (превод Влада)	2003