Order number: 10

Attachment No. 3		**Subject program of the second cycle of studies**			
1.	Title of the teaching subject	Methods and techniques for food quality control			
2.	Code	FE2M23			
3.	Study program	Food engineering – innovation, sustainability and technologies			
4.	Organizer of the study program (unit, i.e. institute, department, department)	Faculty of Technology and Metallurgy, University "St. Cyril and Methodius" in Skopje Department of Food Technology			
5.	Degree (first, second, third cycle)	Second cycle			
6.	Academic year / semester	Year	I	semester	II
7	Course load expressed in ECTS credits	6 ECTS			
8.	Teacher (in the case of multiple teachers designated responsible teacher*)	Dr. Darko Dimitrovski* Dr. Michela Temkov Dr. Alexandra Buzharovska			
9.	Language of instruction	English			
10.	Necessary prerequisites for listening and passing the subject	Knowledge of the composition of food and the techniques for its processing and preservation. Knowledge of the concept of spoilage, contamination and shelf life of food. Basic knowledge of microbiology and food safety, including the role of microorganisms in food spoilage and preservation. Basic knowledge of food safety standards and practices (eg HACCP). Understanding chemical reactions in food. Basic knowledge of analytical instruments and their working principle. Knowledge of techniques specific to food quality testing			
11.	Objectives of the subject program (competencies) and learning outcomes:	**Objectives of the program:** To understand the importance of quality control in food production and distribution To comprehensively describe the attributes of food quality, including sensory, physical, chemical and microbiological factors. To master the methods of food quality control, including analytical methods as well as modern laboratory and instrumental techniques for food analysis. To learn the application of statistical tools in food quality assurance as well as for analyzing and interpreting data To encourage innovative thinking in developing and implementing quality improvement strategies. **Learning outcomes:** 1. To acquire skills in the application of physical, chemical and microbiological methods for food quality assessment 2. To acquire skills in the use and principle of work in advanced			

		instrumentation. 3. To learn to interpret the results of the used methods and techniques for food quality control. 4. To train students to solve challenges in food quality control.		
12.	Detailed course content by chapter and unit with learning outcomes for each chapter	Techniques for the analysis of food constituents (moisture analysis, ash analysis, lipid analysis, protein analysis, carbohydrate analysis, vitamin analysis, contaminant analysis, pesticide analysis); Chromatographic analyzes (GC-MS; HPLC); Spectroscopic analyzes (FTIR-NIR, FTIR, UV-Vis, Atomic Absorption, NMR); Physical tests (viscosity, texture, color); Advanced techniques for food quality control; DNA-based techniques; Methods and procedures for microbiological control of food products; Principles and objectives of microbiological control; Standard methods and techniques for the microbiological examination of separate groups of food products; Application of enzymes in food analysis; Immunological methods.		
13	Interrelationship of subjects	There is none		
14.	Detailed description of teaching and working methods for the subject	Interactive theoretical and practical teaching combined with independent work and individual consultations will be applied in all teaching chapters of the course to a varying extent, depending on the number of students. Individual and possibly group or team collaborative and cooperative methods of active learning will be used from the teaching methods. Developing skills for displaying and presenting research according to the latest relevant scientific research in the field of food chemistry and physics.		
15.	Total available fund on time	180 hours		
16.	Forms of teaching activities	16.1.	Lectures - theoretical teaching. hours	45
		16.2.	Exercises (laboratory, classroom), seminars, teamwork: lessons	21
		16.3.	Practice: classes	24
17.	Other forms of activities	17.1.	Project assignments: lessons	40
		17.2.	Independent assignments: lessons	10
		17.3.	Home study - assignments	40
18.	Conditions of signature	Minimum 11 points from 19.1 and 19.2		
19.	Method of assessment			
	19.1.	Tests: points		10 points
	19.2.	Seminar work/project, written and oral presentation: points		10 points
	19.3	Final exam: points		80 points

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20.	Evaluation criteria (points/grade)			up to 50 points	5 (five) (F)
				51 x to 60 points	6 (six) (E)
				61 x 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)
21.	A method of monitoring the quality of teaching			Based on Article 10 para. 5 of the Guidelines for Self-Evaluation and Evaluation of the Quality of UKIM in Skopje, anonymous surveys of students are conducted on the quality of the teacher and associate staff and an anonymous survey on the general conditions for studying.	
22.	Literature				
	22.1.	Required reading			
		Ord. number	Author	Title	Publisher	Year
		1.	Suzanne Nielsen (Ed.)	Food Analysis	Springer	2010
		2.	I. Akyar	Latest Research into Quality Control	IntechOpen	2012
		3.	Aco Dimitrovski, Donka Doneva Shapcheska, Darko Dimitrovski	Microbiological control of food products	University "St. Cyril and Methodius - Skopje	2011
	22.2.	Additional literature				
		Ord. number	Author	Title	Publisher	Year
		1.	J. Hajslova T. Cajka	Application of gas chromatography in food analysis; TrAC Trends in Analytical Chemistry	Elsevier	2003
		2.	Pranjal Chandra, Parmjit S. Panesar (Eds.)	Nanosensing and Bioanalytical Technologies in Food Quality Control	Springer	2022
		3.	Scientific papers from renowned journals from the last five years in the field of analytical methods and food quality control			