

Annex no. 3		First cycle study program			
1.	Title of courses	Digital Technology in Orthodontics Technique and Practice			
2.	Code	PDTEDT2			
3.	Study Program	Professional Dental Technicians			
4.	Organizer of the study program (unit, i.e. institute, department, division)	UKIM - Faculty of Dentistry – Skopje, Orthodontics Department			
5.	Degree (first, second, third cycle)	First Cycle			
6.	Academic year/semester	Year	2	semester	4
7.	Course load expressed in ECTS credits	3			
8.	Teacher (in case of multiple teachers, a responsible teacher is appointed)	Prof. Dr. Irena Gavrilovikj and teachers from the Department of Orthodontics			
9.	Course language	English			
10.	Necessary prerequisites for listening to and passing the course	Attended all compulsory courses of second year			
11.	Course objectives (competencies) and learning outcomes:	The student will understand the importance of applying digital technology in orthodontics. Intraoral scanning and CAD/CAM technology in the application of braces positioning. The student will obtain knowledge about the application of digital orthodontics in the creation of aligners and CAD/CAM technology in the manufacture of retention appliances.			
12.	Detailed content of the course by chapters and units with learning outcomes for each chapter	Theoretical teaching 1. Chapter – Digitalization in Orthodontics Scanning in Orthodontics 1 class CAD/CAM components 1 class CAD/CAM designed brace system 1 class Ormco insignia 1 class Sure smile process – ORAMETRIX 1 class Application of the CAD/CAM system in lingual orthodontics 1 class Virtual positioning of brackets 1 class Indirect positioning of brackets 1 class <i>Outcomes of the 1st chapter - The student will focus on education in the application of digital methods in the design and manufacture of orthodontic appliances.</i> 2. Chapter Application of artificial intelligence (AI) in orthodontics..... 1 class Application of digital orthodontics in creating aligners 1 class 3D virtual planning in orthognathic surgery and fabrication of splints in orthognathic surgery 2 classes CAD/CAM fabricated mini implants 1 class Application of CAD/CAM technology when using rapid maxillary expansion appliances 1 class Manufacturing of retention appliances using CAD/CAM. 1 class <i>Outcomes of the 2nd chapter. The student will be educated on virtual positioning of brackets from the vestibular and lingual sides, on fabrication of mini implants using CAD/CAM technology. The student will focus on the application of digital creation of aligners and the application of CAD/CAM in the manufacture of retention appliances.</i>			

		Total.....15 classes <i>Exercises:</i> For each of the above theoretical methodological units, students will conduct literature review and prepare seminar papers on the use of digital technology in orthodontic technique and practice, which they will present to fellow students and the responsible teacher. Total: 15 classes				
13	Interrelationship of courses	Basics of orthodontics, Orthodontic appliances 1, Orthodontic appliances 2				
14.	Detailed description of the teaching and working methods for the subject	Interactive teaching, work in small groups, introduction to digital scanning methods, application of CAD/CAM technology in vestibular and lingual positioning of braces. Introduction to the methods for applying digital orthodontics in creating aligners. Introduction to the fabrication of mini implants using CAD/CAM technology and 3D virtual planning in orthognathic surgery. Application of CAD/CAM technology in the use of rapid maxillary expansion appliances and the manufacture of retention appliances using CAD/CAM.				
15.	Total available classes fund	90 classes				
16.	Forms of teaching activities	16.1.	Lectures - theoretical teaching, classes	15		
		16.2.	Exercises (laboratory, classroom), seminars, teamwork: classes	15		
		16.3.	Practice: classes			
17.	Other forms of activities	17.1.	Project work: classes			
		17.2.	Individual work: classes	20		
		17.3.	Homework - tasks	40		
18	Signature requirements	Attendance to theoretical classes and exercises				
19	Method of the evaluation		Written and oral			
	19.1.	Tests: points	50 points			
	19.2.	Seminar work/project, written and oral presentation: points	10			
	19.3.	Final exam: points	40			
20	Evaluation criteria (points/grade)		up to 59 points	5 (five) (F)		
			from 60 to 68 points	6 (six) (E)		
			from 69 to 76 points	7 (seven) (D)		
			from 77 to 84 points	8 (eight) (C)		
			from 85 to 92 points	9 (nine) (B)		
			from 93 to 100 points	10 (ten) (A)		
21.	Method of monitoring the quality of teaching	Self-evaluation by students, control of assistants in carrying out practical teaching and assessment of the achieved success of students, as well as the pass rate of students who have passed the course				
22.	Literature					
	22.1.	Compulsory literature				
		Serial number	Author	Title	Publisher	Year

		1.	Vincenzo Quinzi, Vincenzo Ronsivalle, Vincenzo Campanella, Leonardo Mancini, Salvatore Torrisi and Antonino Lo Giudice	New Technologies in Orthodontics: A Digital Workflow to Enhance Treatment Plan and Photobiomodulation to Expedite Clinical Outcomes	Applied Science	2020
		2.	Inês Francisco, Madalena Prata Ribeiro, Filipa Marques, Raquel Travassos, Catarina Nunes, Flávia Pereira, Francisco Caramelo, Anabela Baptista Paula and Francisco Vale	Application of Three-Dimensional Digital Technology in Orthodontics: The State of the Art	Biomimetrics	2022
		3.	<u>Chris Keating</u> <u>Jennifer Haworth</u> <u>Farnaz Parvizi</u>	Digital workflows part 1: applications of digital technology in orthodontics	Orthodontics	2023
		For further reading				
	22.2.	Serial number	Author	Title	Publisher	Year
		1.	Linda Sangalli, Fabio Savoldic, Domenico Dalessandria, Luca Viscontia, Francesca Massettia, Stefano Bonettia	Remote digital monitoring during the retention phase of orthodontic treatment: A prospective feasibility study	The Korean Journal of Orthodontics	2005
		2.	Aristides B. Melkos	Advances in digital technology and orthodontics: a reference to the Invisalign method	Medscimonit	2005
		3.	Monica S. Barreto, Jorge Faber, Carlos J. Vogel, Telma M. Araujo	Reliability of digital orthodontic setups	Angel Orthodontist	2016