

	22.2.	For further reading				
		Serial number	Author	Title	Publisher	Year
		1.	Phillips	Science of dental materials	Elsevier	2003
		2.	Craig's	Restorative dental materials	Elsevier	2008

Serial number: 4

Annex no. 3		First cycle study program			
1.	Title of courses	Dental Laboratory Equipment			
2.	Code	PDTMLE1			
3.	Study Program	Professional Dental Technicians			
4.	Organizer of the study program (unit, i.e. institute, department, division)	UKIM - Faculty of Dentistry – Skopje, Department of Dental Prosthetics			
5.	Degree (first, second, third cycle)	First Cycle			
6.	Academic year/semester	Year	1	semester	1
7.	Course load expressed in ECTS credits	6			
8.	Teacher (in case of multiple teachers, a responsible teacher is appointed)	Prof. Emilija Bajraktarova Valjakova, PhD and teachers from the Department of Dental Prosthetics			
9.	Course language	English			
10.	Necessary prerequisites for listening to and passing the course	None			
11.	Course objectives (competencies) and learning outcomes:	The student will become familiar with the legal regulations for opening a dental laboratory, the devices and instruments necessary for the functioning of the laboratory and for the manufacture of prosthetic (fixed and mobile) dentures and orthodontic appliances.			
12.	Detailed content of the course by chapters and units with learning outcomes for each chapter	Theoretical teaching: 1. Space and equipment of the dental laboratory 2 classes <i>Learning outcomes: The student is introduced to the legal norms for opening a dental laboratory - required space and equipment, as well as the constituent elements of a dental technician's workplace. Special emphasis is dedicated to ergonomics in order to save labor.</i> 2. Technical motor, handpiece, aspirator and instruments and devices for increasing the field of view 2 classes <i>Learning outcomes: The student is introduced to different models of technical motors and attachments within the workplace, aspirators for the purpose of protecting the dental technician, as well as various possibilities for increasing the working field: magnifying glasses, stereomicroscope.</i> 3. Instruments and devices for working with plaster 2 classes <i>Learning outcomes: The student is introduced to the instruments used when working with plaster: a cup and spatula, a plaster knife, plaster cutting pliers and a filling table, a scalpel, a modeling saw, plaster cutters and separators, as well as devices for vacuum mixing plaster, a vibrator and a plaster trimmer.</i> 4. Instruments for making working models and removable dental			

		stumps 2 classes <i>Learning outcomes: The student is introduced to the instruments used in casting imprints for making the base of the working models – sockets and obtaining movable working stumps: sockets with guide grooves, Ney pins, double metal V-shaped pins with a sleeve, as well as the role of retention rings.</i> 5. Instruments and devices for working with wax 2 classes <i>Learning outcomes: The student is introduced to the instruments for working with wax – different types of knives, instruments and devices for softening the wax (chambers for immersing moving work stumps) and modeling (thermo-knife), devices for producing flame (alcohol lamp, burners) and types of flame, instruments for measuring wax thickness and for polishing.</i> 6. Instruments for filling and casting. 2 classes <i>Learning outcomes: The student is introduced to the instruments for filling and casting: cuvettes – rings, base of the cuvettes, shaper of the casting funnel, expansive strips, muffles for heating the alloy, tongs, hammer and pliers for the filling table.</i> 7. Devices for preheating, heating and casting, soldering and puncturing 2 classes <i>Learning outcomes: The student is introduced to preheating ovens – dryers, for main heating – annealing or combined, as well as the devices used for casting dental alloys (centrifugal, vacuum-compression). The student is also introduced to the soldering and puncturing devices that are especially used in orthodontics.</i> 8. Instruments and devices for processing metal restorations 2 classes <i>Learning outcomes: The student is introduced to the instruments used to process metal castings:</i> <i>rotating instruments for separating and scraping, different types of grinding bodies, metal thickness gauges, sandblasting devices, as well as devices for cleaning the processed metal restorations.</i> 9. Instruments for veneering with ceramic materials..2 classes <i>Learning outcomes: The student is introduced to the instruments and devices for selecting color, porcelain tiles for mixing the ceramic material, metal instruments for applying and modeling the ceramics, a holder - a trowel, brushes for applying opaque and ceramics, scalpels, tweezers, supports and rests for firing metal-ceramic restorations, instruments for processing ceramics.</i> 10. Instruments and devices for polymerization in the manufacture of removable prostheses and duplication 2 classes <i>Learning outcomes: The student is introduced to the instruments and devices used in the final stages of the production of mobile prosthetic restorations and orthodontic appliances:</i> <i>cuvettes, brackets, presses, rinsing instruments and wax rinsing devices. Special emphasis is placed on doubling instruments and techniques, as well as devices used for melting the doubling mass and impregnating the doubled models with wax.</i> 11. Parallelometers and milling devices 2 classes <i>Learning outcomes: The student is introduced to the devices used in the production of skeletalized - vizil dentures, as well as fixed</i>
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		<i>constructions that come as part of a combined prosthetic restoration - parallelometers and milling devices: their division, purpose, parts - instruments, functions and method of operation.</i> 12. Devices and instruments for mechanical and electrolytic polishing 2 classes <i>Learning outcomes: The student is introduced to the term "polishing" as the final stage of the production of prosthetic restorations and orthodontic appliances, the instruments and devices used for mechanical polishing (with a technical motor and a handpiece or polishing motor):</i> <i>pebbles, discs, rubbers, felts, brushes, as well as devices used for electrolytic polishing. The student is also introduced to the term "galvanization" and the devices used for that purpose.</i> 13. Devices for polymerization of acrylic and composite materials 2 classes <i>Learning outcomes: The student is introduced to the different types of devices for polymerization of acrylic, composite materials: in heated water and under pressure – rapid technique, with heated, dry air – pyroplast technique and apparatus for light polymerization.</i> 14. Ceramic firing and pressing furnaces 2 classes <i>Learning outcomes: The student is introduced to devices used for firing ceramic materials in the production of metal-ceramic restorations, devices for pressing ceramic ingots, and furnaces for sintering and fusing.</i> 15. CAD-CAM devices and devices for 3-D printing 2 classes <i>Learning outcomes: The student is introduced to the latest technologies for the production of prosthetic restorations and orthodontic appliances and aids: their component elements, possible technologies (3-D printers), and the method of operation.</i> Total: 30 classes Laboratory exercises Introduction to the instruments and devices used in dental laboratory and the method of working with them. Total: 15 classes		
13.	Interrelationship of courses	This course is related to all professional subjects that include practical work for the student enrolled in the Professional Dental Technicians study program; laboratory exercises are conducted using various devices and instruments in the dental laboratory.		
14.	Detailed description of the teaching and working methods for the subject	Theoretical teaching, student interaction, visit to a dental laboratory, introduction to the components of the dental technician workplace and demonstration of the devices and instruments used in the daily work of the dental technician, independent research, work in small groups in preparing the seminars, work in a large group in presenting them.		
15.	Total available classes fund	180 classes		
16.	Forms of teaching activities	16.1.	Lectures - theoretical teaching, classes	30
		16.2.	Exercises (laboratory, classroom), seminars, teamwork: classes	15
		16.3.	Practice: classes	

17.	Other forms of activities		17.1.	Project work: classes		15
			17.2.	Individual work: classes		
			17.3.	Homework - tasks		110
18	Signature requirements		To obtain a signature, attendance to at least 60% of the theoretical classes and demonstrated activity in the classes, attendance to at least 80% of the exercises, and a prepared and presented project assignment are required.			
19	Method of the evaluation					
	19.1.	Tests: points			30	
	19.2.	Seminar work/project, written and oral presentation: points			10	
	19.3.	Final exam: points			60	
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, assessment of the achieved success of students at the colloquia conducted during the semester, 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.	E. Petkova - Ivanova, G. Kovachevska, B. Kapushevska, D. Veleski, J. Bundevska	Instruments and Appliances in Dental Laboratory	Faculty of Dentistry	2005
		2.	E. Bajraktarova Valjakova	Presentation slides	Faculty of Dentistry	
		3.				
	22.2.	For further reading				
		Serial number	Author	Title	Publisher	Year
		1.				
		2.				
3.						

Serial number: 5

Annex no. 3		First cycle study program
1.	Title of courses	Ergonomics
2.	Code	PDTMER1
3.	Study Program	Professional Dental Technicians
4.	Organizer of the study program (unit, i.e.	UKIM - Faculty of Dentistry – Skopje, Department of Dental Diseases and Endodontics