

1	Subject	REGENERATIVE DENTISTRY			
2	Code	DRS610			
3	Study Program	Study Program of Integrated studies in dental medicine			
4	Organizing Institution (Unit, Institute, Chair, Department)	Department for oral surgery and Department for oral pathology and periodontology			
5	Educational degree (first or second cycle)	Integrated study			
6	Study year/semester	6/11	7	Number of credits	2
8	Teacher	Prof. M. Peeva-Petreska, Associate prof.D.Veleska-Stevkovska, Prof.A.Atanasovska Stojanovska			
9	Preconditions	/			
10	<p>Teaching goals:</p> <p>The optional subject Regenerative Dentistry is intended to provide a detailed overview of contemporary scientific information on the materials and methods used in regenerative dentistry, with emphasis on bone regenerative graft materials for local enlargement of bone volume, as well as augmentation procedures and regeneration of the soft tissues and periodontal complex. Emphasis will also be placed on the use of autologous materials, their preparation and application for accelerated bone and soft tissue regeneration. Upon completion of the curriculum, students will be thoroughly informed about the benefits of the clinical use of autologous blood derivatives PRP and PRF in clinical practice.</p> <p>Regenerative dentistry will also cover the trend in the use of biological and conceptual information on stem cells, dental stem cells, and induced pluripotent stem cells. Students will gain a degree of awareness of the most up-to-date therapeutic concepts and trends in the field of regenerative dentistry and medicine, especially in the area of craniofacial defect regeneration, new inventive methods of creating regenerative matrix carriers, perspectives in regeneration of dental pulp and periodontal complex, as well as gaining basics for 3D printing in dentistry. A better understanding of the field of regenerative dentistry would encourage students after completing first cycle of studies graduation to continue with the postgraduate education in the field of regenerative dentistry as well as to use new modern regenerative biological concepts in their practice.</p>				
11	Brief content				
	Theoretical course				Class
	1. Introduction to Regenerative Dentistry, biological basis, classification and characteristics of graft Materials				1
	2. Principles and techniques of bone augmentation and regeneration (GBR -guided bone regeneration)				2
	3. Overview of barrier membranes in regenerative dentistry (resorbable, non-resorb able, biological membranes), indications, role of regenerative membranes, membrane fixation and stabilization, biological space maintenance				1
	4. Autologous blood products. First generation of platelet rich plasma and second generation of platelet rich fibrin (introducing the concept of PRP and PRF)				1
	5. Biology of wound healing, biology of PRF composition, growth factors (PDGF, TGF-b, VEGF, insulin-like growth factor, EGF), their cellular origin and their biological action				1
	6. Indications and clinical use of PRF (oral surgery, periodontal surgery, prosthetic surgery, implantology, use of PRF in BRONJ, etc.)				1
	7. Stem Cells - definition, types (adult and embryonic stem cells), isolation and multiplication				1
	8. Clinical perspectives and cell-based therapies in regenerative medicine (application of dental stem cells to extraoral and intraoral tissues)				1
	9. 3D printing in regenerative dentistry: advanced technology in craniofacial regeneration				1
	10. Periodontal wound healing Guided tissue regeneration GTR (principles and techniques)				1
	11. Periodontal regenerative therapy for deep infra-bony defects (materials and procedures)				1
	12. Periodontal regenerative therapy in different degrees of furcation involvement in molars (materials and procedures)				1

	13.Periodontal regenerative therapy for gingival recessions and root exposure		1	
	14. Biological effects of growth factors in regenerative periodontal therapy , Indication and clinical use of Emdogain		1	
	15. Gene therapeutics for periodontal tissue repair			
	Total		15	
	Seminars		Class	
	Elaboration of topics from the relevant material, presentation of the topics by the students and active involvement in the students until discussion of the given topic.		15	
12	Methods of studying: class room oriented lectures, interactive lectures, group work, practical training, seminar paper			
13	Total available time	60 classes		
14	Organization of the course	15 classes - theoretical course, 15 classes- seminars, 30 classes - home individual learning and other activities		
15	Forms of teaching activities	15.1.	Theoretical course	15 classes
		15.2.	Practical course, seminars	15 classes
16	Other forms of activities	16.1.	Project tasks	
		16.2.	Individual tasks	
		16.3.	Individual (home) learning	30 classes
17	Method of assessment	17.1.	Tests	30 points
		17.2.	Active participation, seminar paper/project (oral/written presentation)	10 points
		17.3.	Final (oral) exam	60 points
18	Grading criteria (points / grade)	Up to 59 points		5 (five) (F)
		from 60 to 67 points		6 (six) (E)
		from 68 to 75 points		7 (seven) (D)
		from 76 to 84 points		8 (eight) (C)
		from 85 to 93 points		9 (nine) (B)
		from 94 to 100 points		10 (ten) (A)
19	Requirement for signature and taking the final exam	<p>The student is required to actively follow all of the planned activities.</p> <p>Conditional criteria for assessment of knowledge: In order to get a signature, the student should obtain minimum points theoretical courses and to present seminar paper; In order to take the final exam, the student should obtain the minimum points from activity and test; If the student has not obtained the minimum points in the continual assessments, he/she in next exam session will have paper part of the exam (40 points) and final exam (60 points)</p>		
20	Language of the course	English		
21	Method for evaluation of the quality of education	Anonymous student's evaluation of the subject, teachers and collaborators involved in the educational activities		
22	Literature			
	22.1.	Mandatory textbooks		

		No.	Author	Title	Publisher	Year	
		1.	Mona K. Marei	Regenerative Dentistry (Synthesis Lectures on Tissue Engineering)	Morgan and Claypool Publishers; 1 edition	2010	
		2.	Rachel J. Waddington PhD, Alastair J. Sloan PhD	Tissue Engineering and Regeneration in Dentistry: Current Strategies	John Wiley & Sons, Ltd.	2017	
		3.	Platelet Rich Fibrin in Regenerative Dentistry : Biological Background and Clinical Indications	Miron Richard J., Dr., Ph.D., Choukroun, Joseph, M.D.	Blackwell Pub (US)	2017	
	22.2.	Additional literature					
		No.	Author	Title	Publisher	Year	
		1.	Jing Wang and YunFeng Lin	Mesenchymal Stem Cells and Craniofacial Regeneration Volume: 1	Bentham Books	2016	