

Course Title	Orthodontic Biomechanics, Mechanics, Materials, and Contemporary Appliances				
Course Code	MOR618				
Course Type	Compulsory				
Level	Master (2nd Cycle)				
Year / Semester	1 st Year / 2 nd Semester				
Teacher's Name	TBA				
ECTS	5	Lectures / week	2 / 20 weeks	Laboratories / week	3 / 20 weeks
Course Purpose and Objectives	<p>The course will present to the students the biological aspects of orthodontic tooth movement and the various characteristics and modes of actions of the biomechanical systems used in orthodontic treatment.</p> <p>The course will provide the students with the required knowledge for the identification of indicating factors for the use of removable orthodontic appliances and functional appliances. The students will learn about the design and fabrication of these appliances as well as their fitting and activation.</p> <p>The course will provide the students with the required knowledge for the identification of indicating factors for the use of extraoral orthodontic appliances and for the use of fixed appliances in general. The students will also learn about the design and fabrication of these appliances as well as their fitting and activation.</p> <p>For a comprehensive understanding of all above-mentioned subjects a thorough review of all materials used in orthodontic mechanotherapy and their presence in the fixed and removable orthodontic appliances with regards to their chemical and mechanical properties will be presented.</p> <p>Knowledge gained by the students will be used in providing by them efficient, predictable and safe orthodontic therapy according to the individual and specific needs of their patients.</p>				
Learning Outcomes	<p>At the completion of this course the students should:</p> <ol style="list-style-type: none"> 1. Understand the biological basis of tooth movement. 2. Apply sound biomechanical principles during orthodontic treatment planning. 3. Understand the different anchorage requirements and be capable in preserving it by appropriate mechanical designs. 4. Know the scope, mode of action and limitations of removable appliances. 5. Know the scope and limitations of functional appliances. 6. Know the scope and limitations of extraoral forces. 7. Know the scope and limitations of fixed orthodontic appliances. 8. Describe the various types of fixed orthodontic appliances. 				

	9. Explain arch-wire sequences and their justification.		
Prerequisites	None	Co-requisites	None
Course Content	<p>Students will familiarize themselves with the following:</p> <ol style="list-style-type: none"> 1. The biologic basis of orthodontic therapy. 2. Periodontal and osseous tissues response to normal function. 3. Periodontal and osseous tissues response to orthodontic forces. 4. Anchorage and Its control. 5. Undesirable effects of orthodontic forces. 6. Skeletal effects of orthodontic forces: Growth modification. 7. Mechanical principles in orthodontic force control. 8. Elastic materials and the production of orthodontic force. 9. Design factors in orthodontic appliances. 10. Mechanical aspects of anchorage control. 11. Determinate vs. indeterminate force systems. 12. Contemporary orthodontic appliances. 13. Removable appliances. 14. Fixed Appliances. 15. Orthodontic Materials. 16. Orthodontic adhesives. 17. Esthetic brackets. 18. Orthodontic alloys. 19. Clear aligners. 20. Biological properties of orthodontic materials. 		
Teaching Methodology	Face-to-face		
Bibliography	<p>Bishara SE. Textbook of Orthodontics. Philadelphia: WB Saunders, 2001.</p> <p>Burstone CJ, Marcotte MR. Problem Solving in Orthodontics. Goal-Oriented Treatment Strategies. Chicago: Quintessence, 2000.</p> <p>Burstone CJ, van Steenberg E, Hanley KJ. Modern Edgewise Mechanics and the Segmented Arch Technique. Glendora: Ormco Corporation, 1995.</p> <p>Clark WJ. Twin Block Functional Therapy. Edinburgh: Mosby, 2002.</p> <p>Eliades T, Athanasiou AE. Orthodontic Aligner Treatment: A Review of Materials, Clinical Management, and Evidence. New York: Thieme, 2021.</p> <p>Eliades T, Brantley WA (eds). Orthodontic Applications of Biomaterials – A Clinical Guide. Cambridge, MA: Woodhead Publishing, Elsevier, 2018.</p>		

	<p>Eliades T, Pandis N. Self-Ligation in Orthodontics. Oxford: Wiley-Blackwell, 2009.</p> <p>Fiorelli F, Melsen B. Biomechanics in Orthodontics v4. http://www.ortho-biomechanics.com/en/</p> <p>Graber LW, Vanarsdall Jr RL, Vig KWL, Huang GJ. Orthodontics – Current Principles and Techniques. St. Louis: Mosby, 2017.</p> <p>Krishnan V, Davidovitch Z. Biological Mechanisms of Tooth Movement. Oxford: Wiley-Blackwell, 2009.</p> <p>Langlade M. Optimization of Orthodontic Elastics. Central Islip: GAC International, 2000.</p> <p>Lee JS, Kim JK, Park Y-C, Vanarsdall Jr RL. Applications of Orthodontic Mini-Implants. Chicago: Quintessence, 2007.</p> <p>Littlewood SJ, Mitchell L. An Introduction to Orthodontics. Oxford: Oxford University Press, 2019.</p> <p>Orton HS. Functional Appliances in Orthodontic Treatment. An Atlas of Clinical Prescription and Laboratory Construction. London: Quintessence, 1990.</p> <p>Pancherz H, Ruf S. The Herbst Appliance. Research-based Clinical Management. Berlin: Quintessence, 2008.</p> <p>Papadopoulos MA. Orthodontic Treatment of the Class II Noncompliant Patient. Current Principles and Techniques. Edinburgh: Mosby Elsevier, 2006.</p> <p>Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics. St. Louis: Elsevier Mosby, 2013:278-311,312-346,347-389.</p> <p>Williams S, Bundgaard P. Extraoral Orthodontic Appliances. Aarhus: The Royal Dental College, 1985.</p>		
Assessment	Final Examination Laboratory / Clinical Work / Oral presentations	60% 30%	

	Class Participation and Attendance Total	10%	
		100%	
Language	English		