Syllabus

**BIOMECH. PRINC. & APPL. IN THE CRANIOFACIAL SYST - 97946**

*Last update 22-10-2015*

**HU Credits:** 3

**Degree/Cycle:** 2nd degree (Master)

**Responsible Department:** dental medicine

**Academic year:** 0

**Semester:** 1st Semester

**Teaching Languages:** English

**Campus:** Ein Karem

**Course/Module Coordinator:** Dr. Atalia Wasserstein and Prof. Stella Chaushu

**Coordinator Email:** ataliawa@gmail.com

**Coordinator Office Hours:** None

**Teaching Staff:**

- Dr. Atalia Wasserstein
Course/Module description:
This course provides a broad insight into both the theoretical and the clinical aspects of the mechanics and typical tissue responses to force systems used in orthodontic appliances.

Course/Module aims:
- Describe all tissue reactions associated with orthodontic tooth movement and discuss implications for planning force magnitude, direction and duration.
- Discuss tissue damage in response to orthodontic forces.
- List and discuss the major concepts and principles that are required to produce the diverse orthodontic movements.
- Define the concept "system equilibrium" and discuss the implications for planning orthodontic anchorage.
- Compare and contrast the terms "stress-strain diagram" and "load-deflection diagram".
- Compare and contrast the mechanical principles of different orthodontic appliances: standard edgewise brackets, preadjusted straight-wire brackets, Begg/Tip-Edge brackets, orthopedic and functional appliances.
- Define friction in orthodontics and understand how it is generated and how to reduce it.
- Compare different properties of materials used in orthodontics.

Learning outcomes - On successful completion of this module, students should be able to:
- Plan safe, predictable and efficient orthodontic treatment
- Integrate the knowledge on force and moments and be able to perform advanced clinical orthodontic biomechanics
- Describe and demonstrate appropriate biomechanics in multidisciplinary treatments
- Evaluate the most suitable wire material for each stage of treatment
- Interpret the side effects created by the reactive forces
- Design the most efficient mechanical strategy to avoid tissue damage

Attendance requirements(%): 80%

Teaching arrangement and method of instruction: Frontal lectures and seminars.
Reading assignments for each seminar session is to provide background information for class discussions related to the scheduled topics.

**Course/Module Content:**
- The periodontium- structure and function
- Tissue response to mechanical forces
- Signal transduction of mechanical force
- Bone biology
- Stress- strain diagrams
- Wire materials
- Basic concepts of tooth movement
- One couple systems
- Two couple systems
- Asymmetric mechanics
- Removable appliances vs. fixed appliances in generating forces
- Mechanics of springs, screws and elastics
- Friction in orthodontics

**Required Reading:**
12. Wilkinson P: Load-deflection characteristics of superelastic nickel-titanium

Additional Reading Material:
None

Course/Module evaluation:
End of year written/oral examination 100 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
None