האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

DENTAL MATERIALS - 97718

Last update 08-11-2015

HU Credits: 4

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: dental medicine

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Ein Karem

Course/Module Coordinator: Dr. Feuerstein Osnat

Coordinator Email: osnatf@ekmd.huji.ac.il

Coordinator Office Hours: Monday 10:00-12:00

Teaching Staff:

Dr. Osnat Feuerstein
Dr. Shay Levi
Dr. Eldad Irani

Course/Module description:

The course is composed of frontal lectures, a laboratory demonstration, and student seminars. The frontal lectures comprise most of the course meetings, which focus on the following four primary topics: (1) Terminology and principles of materials science; (2) Structure and properties of the main dental materials, classified to families– polymers, ceramic materials, metals and composite materials; (3) The connection between the theoretical knowledge and its application in the dental clinic; (4) Research methods and scientific literature in dental materials. The student seminars involve student presentations and assessment of published research studies in the domain of dental materials.

Course/Module aims:

The course involves the comprehension of fundamental terms and principles in materials science, with particular emphasis on the relationships between material structures and their properties. The student should recognize the different families of materials and their characteristics, be able to classify dental materials and to apply this theoretical knowledge in practice, in the dental clinic. The final aim is to develop a competence in critical reading and assessment of research studies in the domain of dental materials.

Learning outcomes - On successful completion of this module, students should be able to:

• Define and describe fundamental terms and principles of material science.
• Relate between materials' structures and their properties.
• Classify dental materials into groups, while discriminating between the characteristics of the materials in the different groups.
• Recognize the correspondence between principles and characteristics of dental materials and their appearance in the dental clinic.
• Asses and compare dental materials, based on the knowledge of their composition and structure.
• Formulate a suitable selection of dental materials for specific cases, based on the theoretical knowledge.
• Analyze and criticize published research articles in the domain of dental materials.

• Conclude rational scientific decisions, explain and justify material choice for a specific dental treatment.

Attendance requirements(%):
80%

Teaching arrangement and method of instruction: Lectures & Workshops

Course/Module Content:
• Dental materials course: objectives and program.
• Introduction to materials science: the relationships between material's properties (electrical, mechanical, thermal, chemical, optical) to the atomic, molecular and crystalline structure of materials.
• Amalgam: alloy composition, amalgamation reaction, powder manufacture, working procedure and material properties.
• Polymers, acrylic and resin restorative materials:
1. Polymers: forms of polymerization reactions, polymer structure and properties
2. Acrylic: monomers, polymerization, heat and cold cured acrylic, glass transition temperature, softening and cross-linking
3. Resin composite materials: composition, structure and properties, a comparison to the acrylic polymer, setting and shrinkage, oxygen inhibition, the effects of fillers and resin chemistry on properties, classification, light and self cured materials
4. Solid surface properties, adhesion and bonding. Dental adhesives
5. Biocompatibility of resin composite materials
6. Base and lining materials
• Seminar: sorting and evaluation of the manufacturer's advertizing information of resin composite materials.
• Ceramic materials: types of dental ceramics, structure and properties, sintering, metal-ceramic bonding, all-ceramics.
• Waxes and gypsum materials.
• Elastomeric impression materials: alginates, polysulphide, polyether, and silicones.
• Cements
• Metals: introduction to metals, structure and characteristics, biocompatibility of metals, considerations in choosing alloys for porcelain fused to metal prosthetics and groups of dental alloys.
• Clinical performance and scientific methods to evaluate dental materials.
• Laboratory: lab methods in dental materials science.
• Literature seminar: critical reading in the scientific literature of dental materials.
• Conclusive seminar: students ask and answer questions about clinical manipulation and implications arising from the characteristics of dental materials.

Required Reading:
1. Restorative Dental Materials / RG Craig
2. Philip's Science of Dental Materials / Anusavice

Additional Reading Material:

None

Course/Module evaluation:

End of year written/oral examination 80 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 20 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

None