Course program

**Basic information about the course**

**Title**: Dental materials

**Code**: 71283 Abbreviation 211ODMAT

Lectures: 30

ECTS points: 3

**Department**: Department of Fixed Prosthodontics

**Course leader:**

Professor Ketij Mehulić, DMD., Ph.D

**and associates**:

Professor Zrinka Tarle DMD., Ph. D

Professor Zdravko Schauperl (FSB) Ph. D

Professor Denis Vojvodić DMD., Ph. D

Professor Domagoj Glavina DMD., Ph. D

Professor Nada Galić DMD., Ph. D

Professor Sonja Kraljević DMD., Ph. D

Professor Amir Ćatić DMD., Ph. D

Associate Professor Andreja Carek DMD., Ph. D

Associate Professor Slađana Milardović DMD., Ph. D

Associate Professor Joško Viskić DMD., Ph. D

Associate Professor Josip Kranjčić DMD., Ph. D.

Associate Professor Lana Bergman DMD., Ph. D

Assistant Professor Marko Granić DMD., Ph. D

**Course description**

During the course students are learning about the microstructure, composition, properties and

indications of all dental materials. Student’s ability for analyses and selection of the best materials for each technological and clinical situation has been urged.

**Course includes**: microstructure, mechanical, physical, technological, rheological, chemical and biological properties of dental materials, alloys for fixed and removable prostheses, orthodontics wires ceramic materials, polymers and polymerisation, acrylics, cements, impression materials, model and die materials, waxes, thermoplastic baseplates materials, pastes for functional impressions, investment materials, laboratory materials for final procedures and polishing, resin composites materials, enamel-dentin adhesives systems, pulp covering materials, endodontics materials, dental amalgams, materials in oral, maxillofacial surgery and in periodontology, biocompatibility, sampling and methods for identification of incorporated alloy, analyses of chemical stability and proof of allergy.

Criteria for taking the course exam

**What is graded**

Written exam

**Rules of grading and additional information**

The exam is written with questions from all lectures.

Weekly teaching plan

1. component

**Lecture topics**:

1. Basic Scientific Principles, Microstructure and Properties of Materials in Dental medicine
2. Corrosion and Biocompatibility of Dental Materials, Testing Methods of Dental Materials
3. Laboratory Materials
4. Polymers and Polymerization
5. Investment materials
6. Alloys in Prosthodontics and Orthodontics
7. Impression materials
8. Structure and properties of dental ceramics
9. Cements and Materials for temporary Fillings, Crowns and Bridges
10. Materials in Pedodontics
11. Laboratory Materials for final Procedures and Polishing
12. Materials in Oral, Maxillofacial Surgery and in Periodontology
13. Resin composites materials, Enamel-dentin adhesives systems, Bleaching materials
14. Pulp Covering Materials, Endodontics Materials, Dental Amalgams

**Literature:**

**Required literature**:

1. Mehulić K et al. Dental materials. Zagreb: Medicinska naklada; 2022.
2. Mehulić K i sur. Dentalni materijali. Zagreb: Medicinska naklada; 2017.
3. Anusavice KJ. Phillips Science of Dental Materials. St. Louis: Saunders Elsevier Science; 2003.

**Recommended literature**:

1. Mehulić K. Keramički materijali u stomatološkoj protetici. Zagreb: Školska knjiga; 2010.
2. Živko-Babić J, Jerolimov V. Metali u stomatološkoj protetici. Zagreb; Školska knjiga, 2005.
3. Anthony von Fraunhofer. Dental Materials at a Glance. Second Ed. J. Baltimore College of Dental Surgery. University of Maryland Maryland, USA
4. Gladwin M, Bagby M. Clinical aspects of dental materials.
5. Jakovac M, Kranjčić J. Pretklinička i laboratorijska fiksna protetika. Zagreb: Stega tisak; 2020.

**Required knowledge**

Basic knowledge about the microstructure, mechanical, physical, technological, rheological,

chemical and biological properties of dental materials, to know to choose the proper material

according the clinical situation, to control all laboratory procedures and failures, to find out the reason of failures, of biodegradation and to recognize the biological reaction on some materials. Not to forget sign in dental card the name and the composition of used alloy, according its mechanical properties.

**Required skills**

The skills have been obtained during the practical part of fixed and removable prosthodontics,

and dental pathology. Some aspect of skills will be given in courses like orthodontics, pedodontics, periodontology and oral surgery.

**Exam questions**

Basic of metal structure; solid solutions; metal and alloy properties, micro hardness, micro strength;

types of corrosion; the factors of biodegradation; structure and properties of polymers and types of polymerisation; pulp covering materials; endodontics materials; dental amalgams in clinical praxes; resin composites materials- types and application; enamel-dentin adhesives systems;

waxes for laboratory and clinical use; laboratory and clinical use of thermoplastic compositions materials; the composition, properties and application of elastomers; the composition, properties and application of hydrocolloids; the advantages and disadvantage of functions paste; types of gypsum and its laboratory and clinical applications; Types, composition and properties of investment materials; cements,- classification, applications and requirements; the selection of post-core materials; veneered materials and the types of their polymerisation, indications;

classification, applications and requirements of materials for temporary crowns and bridges; the basic properties of temporary fillings; classification, structure and properties of dental ceramics;

Aesthetics, colour and light; polymers and polymerisation in removable prosthodontics; types and selection of materials in orthodontics; in pedodontics; in periodontology; in oral surgery; surface preparations, laboratory materials for final procedures and polishing; desirable and negative interaction between materials and surrounding tissue; the analyses and methods for detecting the reasons.

**Exam dates**

1th of February 2024

15th of February 2024

13th of June 2024

10th of July 2024

5th of September 2024

**Lectures DENTAL MATERIALS 5th. Semester 2023/24**

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| --- | --- | --- | --- |
| **No.** | **Title** | **Date** | **Lecturer** |
| 1. | Biocompatibility of dental materials | 05.10.2022. | Assoc prof Viskić |
| 2. | Introduction to materials structure and properties  Surface and surface treatment of dental materials | 12.10.2022.  09.30-10.15  10.15-11.00 | Prof Schauperl  Assoc. prof Kranjčić |
| 3. | Standards of Dental materials  Assessment of quality and safety in dental medicine | 19.10.2023. | Prof Glavina |
| 4. | Materials for caries prevention | 26.10.2023. | Prof Glavina |
| 5. | Composite materials and adhesives | 02.11.2023. | Prof Tarle |
| 6. | Materials for dental wound sealing  Root canal filling materials | 09.11.2023. | Prof Galić |
| 7. | Metals and alloys as biomaterials | 16.11.2023. | Assoc prof Carek |
| 8. | Esthetic materials in dentistry;  Materials for conventional veneering of FPD  Provisional materials | 23.11.2023. | Assoc prof Milardović |
| 9. | Impression materials | 30.11.2023. | Prof. Vojvodić |
| 10. | Dental laboratory materials:  plaster, stone, waxes, investing materials | 07.12.2023. | Prof. Kraljević |
| 11. | Dental ceramics  Composition and properties | 14.12.2023. | Assoc prof Viskić |
| 12. | Polymers and polymerization  Physical and mechanical properties of polymers | 21.12.2023. | Prof Kraljević |
| 13. | CAD/CAM  Additive manufacturing in dentistry | 11.01.2024.  09.30-10.15  10.15-11.00 | Assoc prof Bergman  Prof Ćatić |
| 13. | Luting materials in dentistry  Classification, characteristics and applications | 18.01.2024. | Assoc. prof Milardović |
| 14. | Materials in Oral Surgery Procedures | 25.01.2024. | Assoc. prof Granić |

The lectures will be held in the lecture room, 2nd floor, Gundulićeva 5 on Thursdays from 9.30 to 11.00.