1. BASIC INFORMATION

Course	BIOMATHERIALS AND INSTRUMENTAL
Degree program	GRADE IN DENTISTRY
School	VALENCIA
Year	2020-2021
ECTS	6 ECTS
Credit type	MANDATORY
Language(s)	Spanish, English
Delivery mode	Presential
Semester	First semester
Academic year	2021/2021
Coordinating professor	Anabel Gramatges

2. PRESENTATION

Contextualization of the subject inside the module
Through the subject “Biomaterials and Instrumentation” the student will achieve:
Learn the general fundament of the properties of the dental biomaterials.
Familiarize with concepts: Biomaterial, Instrumentation, Ergonomics and Equipment.
Know the structure, chemical composition, setting reaction, properties and manipulation of all materials used in Dentistry.
Develop practical skills to the use and manipulation of the impression and casting materials.
Develop practical skills to the use and manipulation of the fillings materials, metallic or esthetic.
Develop practical skills to the use and manipulation of the cementation materials.
Develop practical skills to the use and manipulation of the laboratory materials.
Contextualization of the competences of Matter within the Module
"Pathology and Odontological Therapeutics" and in the degree.
Knowledge of the biomaterials used in dental diagnosis and treatment in general, studying physical, chemical, thermal, rheological, adhesives, optical, esthetic and biological properties, as well as in particular, studying each material theoretically (knowing the structure composition, chemical setting reaction, properties and clinical or laboratory indications) and practically
(learning the material’s manipulation at the laboratory).

3. COMPETENCIES AND LEARNING OUTCOMES

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CE11, CE12, CE14, CE15, CB1, CB2, CB4 CB5, CG1, CG13, CG17, CG3, CG7, CG8	RA1 RA2 RA3
CE12, CE14, CE15	RA3 RA4

4. CONTENT

THEORETICAL TOPICS

0. Presentation of the subject and contents.

1. General concepts of impression and casting. Physical, chemical and biological properties are treated.

2. Impression materials. Dental casts. Physical, chemical and biological properties are treated.

3. Thermoplastic impression materials: Waxes and Compounds. Physical, chemical and biological properties are treated.

4. Reversible and irreversible hydrocolloids. Physical, chemical and biological properties are treated.

5. Synthesis elastomeric materials: Polysulfides. Polyethers. Silicones. Physical, chemical and biological properties are treated.

6. Investing materials for the casting technique. Physical, chemical and biological properties are treated.

7. Metallurgy: Pure Metals. Physical, chemical and biological properties are treated.

8. Metallurgy: Metal Alloys. Physical, chemical and biological properties are treated.

9. Gold and rich in gold alloys for castings. Physical, chemical and biological properties are treated.

10. Non-precious castings alloys. Physical, chemical and biological properties are treated.

11. Forged alloys. Steels. Wires. Physical, chemical and biological properties are treated.

12. Metal alloys for direct filling: Silver amalgam. Liquid gallium alloy. Physical, chemical and biological properties are treated.

13. Pure titanium and titanium alloys. Physical, chemical and biological properties are treated.

14. Polymerization

15. Polymers for prostheses. Physical, chemical and biological properties are treated.

16. Dental Adhesion I: Adhesion to tooth structure. Physical, chemical and biological properties are treated.

17. Dental Adhesion II: Adhesion between different materials. Physical, chemical and biological properties are treated.

18. Composite resins for direct filling I. Physical, chemical and biological properties are treated.
19. Non-Adhesive cements. Physical, chemical and biological properties are treated.
20. Adhesive cements. Physical, chemical and biological properties are treated.
21. Dental Ceramic I: Classic ceramics. Physical, chemical and biological properties are treated.
22. Dental Ceramics II: Modern glass ceramics. Physical, chemical and biological properties are treated.
23. Materials for endodontics. Physical, chemical and biological properties are treated.
24. Implantable materials. Physical, chemical and biological properties are treated.
25. Other biomaterials: Laser, Magnetic Materials. Physical, chemical and biological properties are treated.

PRACTICAL TOPICS

A. Handling biomaterials Activities in simulation

1. Dental Plasters
2. Thermoplastic materials: waxes and modeling compounds
3. Irreversible hydrocolloids
4. Synthesis elastomeric materials: Polysulfides. Polyethers. Silicones
5. Silver amalgam
6. Auto and light-curing acrylic resins
7. Bonding system
8. Composite resins for direct filling. Using the polymerization lamp
9. Adhesive cements
10.Non-adhesive cements
11.Endodontic materials

B. Activities based on problems about the properties of biomaterials

1. Problems based on the general properties of biomaterials
2. Problems based on the behavior of metallic biomaterials

C. Audiovisual Seminars

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Master class.
- Cooperative learning
- Problem-based learning
- Simulation environments

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Master classes	21.6
Problems activities	12
Activities	7.2
Practical lessons	24
Tutorial sessions	7.2
TOTAL	**72h**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Asessment	Weight
Theoretical exam (2 partial exams and they need to be passed with a 5)	30%
Practical lessons	30%
Oral presentations	15%
Activities	10%
Workbook	15%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in ordinary call, you must obtain a grade equal to or greater than 5.0 out of 10.0 in the final grade (weighted average) of the course.

- Each of the 5 parts of the subject independently with a grade greater than or equal to 5'0 out of 10'0.

- Attend and register the attendance of 75% of the theoretical sessions and 90% of the practical activities. If absences occur in theory, a serial of assignments corresponding to the classes that have not been attended must be carried out. If the absences occur in practices, the student must present on the date indicated by the teacher, videos manipulating the materials of the practices, a summary of 2 articles related to the subject and a power point with the answers required in the practice book.

- There will be two written tests of theoretical knowledge (30%). It will consist of 30 multiple choice questions and one essay question. To pass this part, it is necessary to obtain a grade equal to or greater than 5'0 out of 10'0 in each of them. In case of not obtaining a minimum grade of 5 in any of them, the student must recover this part that has not been passed (or that has not been presented) in the extraordinary call.

- Oral presentation (20%): there will be a group presentation at the end of the semester on a specific assigned topic and following the guidelines explained by the teacher

- A continuous evaluation of simulated preclinical practices (30%) will be carried out. Each practice has its own evaluation rubric. The average grade is obtained between the different grades obtained based on the contents that are evaluated at each moment.

- Attendance at practices is compulsory. 90% attendance to practices has to be attended. Absences of practical sessions must be made up in an extraordinary call as described above. Every 3 time delays greater than 15 minutes, it will be considered as a lack of attendance.

- Practical activities (10%): evaluable practical activities will be carried out in order to assess the knowledge and skills acquired.

- Practice notebook (10%): the practice notebook will be evaluated according to the rubric provided at the beginning of the course.

To pass the practical content evaluation, it is necessary to obtain a grade equal to or greater than 5'0 out of 10'0 in each of the sections, independently.

7.2. Second exam period

The activities not passed in the ordinary call must be delivered, after having received the corresponding corrections from the teacher, or those that were not delivered.

- Deliver (and be evaluated positively) the activities not passed / carried out in ordinary call.

- To pass the extraordinary call, it will be necessary to obtain a grade greater than or equal to 5'0 out of 10'0 in each of the parts.

- If the objective knowledge test is failed, it must be recovered in Extraordinary call with a grade equal to or greater than 5.0 out of 10.0.

- In case of having failed the part of oral presentations, a video with it must be sent within the period established and communicated by the teacher. The grade must be equal to or greater than 5.0 out of 10.0.

- To pass the practical part in an extraordinary call, it is necessary to obtain a grade equal to or greater than 5'0 out of 10'0 in each of the sections.

- The recovery of the simulated preclinical practices, the student must present on the date indicated by the teacher a serial of activities that correspond to the practices that have not been attended / passed indicated by the teacher, in addition to the answers required in the book of that practice.

- The recovery of practical exercises will be carried out in the extraordinary call on the same day as the theoretical knowledge test.

- To recover the practice book, it must be presented correctly on the day that the teacher will communicate in advance.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Activities evaluated	Date
Theoretical evaluations	November and January
Practice lessons	Every week
Oral presentations	8th to 15th january
Activities	At the end of each month
Workbook	Last practice

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

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- MACCHI RL. “Materiales dentales” . Ed. Panamericana. 4a edición. (2007)
- TOLEDANO M, OSORIO R, y cols. “Arte y Ciencia de los Materiales Odontológicos”. Ed. Avances (2003)
- VEGA DEL BARRIO JM, y cols. “Materiales Odontológicos”. Ed. Interamerica (1997)
- Von FRAUNHOFER JA. “Dental Materials at a glance”. Ed. Wiley-Blackwell. (2010)

10.DIVERSITY MANAGEMENT UNIT

Students with specific learning support needs:

Curricular adaptations and adjustments for students with specific learning support needs, in order to guarantee equal opportunities, will be overseen by the Diversity Management Unit (UAD: Unidad de Atención a la Diversidad).

It is compulsory for this Unit to issue a curricular adaptation/adjustment report, and therefore students with specific learning support needs should contact the Unit at unidad.diversidad@universidadeuropea.es at the beginning of each semester.

11.ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.