

## 1. BASIC INFORMATION

<b>Course</b>	Biomaterials
<b>Degree program</b>	Dentistry
<b>School</b>	Biomedical Sciences
<b>Year</b>	2º Course
<b>ECTS</b>	6 Credits ECTS
<b>Credit type</b>	Mandatory
<b>Language(s)</b>	Spanish/English
<b>Delivery mode</b>	Presential
<b>Semester</b>	First Semester
<b>Academic year</b>	2024-25
<b>Coordinating professor</b>	Eva González Tocado y Blanca Cèline de las Heras Vercher

## 2. PRESENTATION

This course aims that the student can achieve sufficient knowledge and skills related to: the evolution and classification of the different types of dental biomaterials. The main physical, chemical and biological general properties that must be taken into account when understanding, selecting and applying dental materials in their preclinical, clinical or laboratory aspects. Recognize and apply the hygienic and safety measures for the handling of each one of the materials used.

## 3. COMPETENCES AND LEARNING OUTCOMES

### Core competences:

**CB1.** That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of his field of study.

**CB2.** That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

**CB4** That students know how to transmit information, ideas, problems and solutions to a specialized and non-specialized public.

**CB5.** That the students have developed the necessary learning skills to undertake later studies with a high degree of autonomy.

### Cross-curricular competences:

**CT1.** Autonomous learning: a process that allows the person to be the author of their own development, choosing the paths, strategies, tools and moments that they consider most effective to learn and implement independently what they have learned. The autonomous student, in short, selects the best strategies to achieve their learning objectives.

**CT3.** Ability to adapt to new situations: Be able to work under different conditions, different people, and in different groups. It involves assessing and understanding positions, adapting one's approach as the situation requires.

**CT7.** Awareness of ethical values: ability to think and act according to universal principles based on the value of the person that are directed to their full development and that entails the commitment with certain social values.

**CT9.** Skills in interpersonal relationships: Interacting positively with other people verbally and nonverbally through assertive communication, understood by this, the ability to express or convey what you want, what you think or feel without bothering, assault or hurt the feelings of the other person.

**CT10.** Initiative and entrepreneurial spirit: preference for assuming and carrying out activities. Ability to undertake difficult or hazardous actions with resolution. Ability to anticipate problems, propose improvements and persevere in their achievement.

### General competences

**CG1.** Know the essential elements of the dentist profession, including ethical principles and legal responsibilities.

**CG3.** Know how to identify the patient's concerns and expectations, as well as communicate effectively and clearly, both orally and in writing, with patients, family members, the media and other professionals.

**CG7.** Promote autonomous learning of new knowledge and techniques, as well as motivation for quality.

**CG8.** Know how to share information with other health professionals and work as a team.

**CG13.** Understand and recognize the sciences of essential biomaterials for dental practice, as well as the immediate management of possible allergies to them.

**CG17.** Understand and recognize the principles of ergonomics and safety at work (including the control of cross infections, radiation protection and occupational and biological diseases).

### Specific competences:

**SC6.** Know the scientific principles of sterilisation, disinfection, and antisepsis necessary to prevent cross-infection in dental practice.

**SC13.** Handle, discriminate and select appropriate materials and instruments in Dentistry.

**SC14.** Know dental biomaterials: their handling, properties, indications, allergies, biocompatibility, toxicity, waste disposal and environmental impact.

**SC17.** Apply the principles of ergonomics in dental work, both individually and within the work team where appropriate, as well as in the principles of occupational risk prevention associated with dental practice.

### Learning outcomes:

**RA1.** Learn the evolution and classification of the different types of dental materials and biomaterials.

**RA2.** Learn the main physical, chemical and biological general properties that must be taken into account when understanding, selecting and applying dental materials in their preclinical, clinical or laboratory aspects.

**RA3.** Recognize and apply the ergonomic, hygienic and safety measures for the handling of each of the materials developed in the subject

**RA4.** Obtain a facilitating learning base for all those subjects that will use dental biomaterials throughout their careers.

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

Competences	Learning outcomes
CB1-CB2-CB4-CB5	RA1

CT1- CT7-CT10-CE13	
CG7-CG8-CG1-CG3- CG7-CG8 CB1-CB3-CB4-CB5 CT1-CT3- CT7-CT10 CE17-CE14-CE13	RA2
CB1-CB2-CB4-CB5 CT1-CT3-CT7-CT9- CT10 CE7-CE17	RA3
CG1-CG3-CG7- CG8 CB1-CB2-CB4-CB5 CT1-CT3-CT7-CT9- CT10 CE13-CE17	RA4

## 4. CONTENT

Topic 1. Presentation of contents

Topic 2. Materials in dentistry

Topic 3. Characteristics and general physical properties of dental materials

Topic 4. Characteristics and chemical properties of dental materials

Topic 5. Characteristics and general biological properties of dental materials

Topic 6. Polymeric Materials

Topic 7. Ceramic Materials

Topic 8. Metallic Materials

## 5. TEACHING-LEARNING METHODOLOGIES

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

- Simulation environments
- Master class
- Cooperative learning
- Problem-based learning (PBL)

## 6. LEARNING ACTIVITIES

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

### Online mode:

Learning activity	Number of hours
Self-study and working	72,5h
Asynchronous virtual master classes	2,5h
<b>TOTAL</b>	<b>75h</b>

### Campus-based mode:

Learning activity	Number of hours
Master classes	22,5h
Lab practices	25h
Problems resolution	12,5h
Tutorial classes	5h
Practical exercises	7,5h
Knowledge test	2,5h
<b>TOTAL</b>	<b>75h</b>

## 7. ASSESSMENT

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

### Campus-based mode:

Assessment system	Weight
Knowledge Test	30%
Practices in lab	30%
Oral Activities	10%
Written activities	10%
Practice notebook	10%

Simodont	5%
Spanish classes	5%

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. Ordinary call

To pass the course in the ordinary call, you must obtain a final course grade of at least 5 out of 10 (weighted average).

To pass the subject in the ordinary call, both the theoretical knowledge tests, the practical knowledge tests and the Spanish classes must have been passed, with a grade greater than or equal to 5 (out of 10), separated. The final average will not be done if the three parts are not pass.

Mandatory requirements:

- The final theory exam will be done through a multiple-choice test at the end of the semester and may include questions aimed at the visual identification of images.
- This exam will consist of 40 multiple-choice questions (4 answers with only one correct answer). Correct answers will add 1-point, wrong answers will deduct 0.33 points and blank answers will score 0. There will be 4 reserve questions with the same evaluation conditions as the official ones.
- It is mandatory to answer 80% of the exam questions in order to pass the subject.
- The date of the final exam will be scheduled from the beginning of the course.
- Oral activities are not recoverable, since they do not prevent the continuous evaluation of the theoretical part carried out by the student and they only suppose additional marks to the final grade of the subject.
- Written activities will only be done in a presential way (in class), requiring a minimum of 9 out of the 13 exercises done throughout the course. If this criterion is not fulfilled, they will be retaken during the follow-up period.

### 7.1.2. Practices

The evaluation of the practices will be carried out periodically after each thematic block by means of rubrics.

To pass the section of the practices of the subject, it is necessary to obtain a 5 (out of 10).

Mandatory requirements:

- Attendance at practices is mandatory and those students who accumulate 3 or more ABSENCES (even if they are justified) will lose the score of their Practical Continuous Evaluation.

- Simodont practice will be recoverable with a written activity.
- The global note of practices must be equal or higher than 5 (approved). If one of the grades of the practices is 3 or less, it is mandatory to assist on the recovery practices date, regardless of the final average.
- If the student does not pass the practices, she/he will not be able to pass the subject. If the Theory is failed and not the Practices, or the opposite, only the approved part will be kept until the extraordinary call in July, and only the failed part must be examined. The note will not be saved from one course to another.
- On the practice recovery day, ONLY one can be recovered (under teachers' assessment).
- The practice notebook must be handed in on the indicated date ONLY in PDF format (the rest will not be assessed). It will be recoverable during the follow-up period.

## 7.2. Extraordinary call

To pass the course in the extraordinary call, you must obtain a final grade of at least 5 out of 10 (weighted average).

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

Simodont practice will be recoverable with a written activity.

## 8. SCHEDULE

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

Assessable activities	Deadline
1º TOPIC-TEACHER	9-10 September
2º TOPIC-TEACHER	16-17 September
3º TOPIC (part I)-TEACHER	23-24 September
3º TOPIC- (part II) TEACHER	30 sept-1 October
4º TOPIC ( part I) TEACHER	7-8 October
4º TOPIC-(part II)TEACHER	14-15 October
5º y 6º TOPIC TEACHER	21-22 October
7º Y 8º TOPIC TEACHER	28-29 October

9º Y 10º TOPIC STUDENTS:OP	4-5 November
11º Y 12º TOPIC STUDENTS:OP	11-12 November
13º Y 14º TOPIC STUDENTS: OP	18-19 November
15º Y 16º TOPIC STUDENTS:OP	25-26 November
17º Y 18º TOPIC STUDENTS:OP	2-3 December
19º Y 20º TOPIC STUDENTS:OP	9-10 December
TUTORIALS/DOUBTS	16-17 December
FINAL EXAM	January not yet determined

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.

### **STUDENTS ORAL PRESENTATION**

Topic 9. Polymeric Materials I-Printing Materials

Topic 10. Polymeric Materials II- Acrylics

Topic 11. Polymeric Materials III - Composite Resins

Topic 12. Polymeric materials IV. Waxes, thermoplastic materials, gutta-percha.

Topic 13. Ceramic Materials I. Plaster. Others

Topic 14. Ceramic Materials II. Cements

Topic 15. Ceramic Materials III. Porcelanas and viroceramicas

Topic 16. Metallic Materials I. Noble Metals.

Topic 17. Metallic Materials II. Non-noble metals.

Topic 18.- Metallic Materials III. Titanium and silver amalgams.

Topic 19. Metallic Materials IV. Other Metal Alloys

Topic 20. Bone Regeneration Materials

## **9. BIBLIOGRAPHY**

The recommended Bibliography is:

- VEGA DEL BARRIO JM. Materials in dentistry. Biological, clinical and physicochemical fundamentals. Ed Advances. Madrid, 1996.

- CRAIG RG. Restorative dentistry materials. Ed Harcourt Brace. Madrid, 2002
- SKINNER EW., PHILLIPS RW. The science of dental materials. Ed Nueva Editorial Interamericana. Mexico, 1993.
- ANDERSON JF, MC CABE Dental application materials. Ed Salvat SA. Barcelona, 1988.
- O'BRIEN WJ., RYGE G. Dental materials and their selection. Ed Medica Panamericana. Buenos Aires, 1980
- PEYTON FA., CRAIG RG. Restorative dental materials. Ed Mindi SAIC. Buenos Aires, 1974.
- BURDAIRON G. Manual of dental biomaterials. Ed Masson SA. Barcelona, 1991.
- REIBSBICK MH., GARDNER AV. Dental materials in clinical dentistry. Mexico DF. 1982
- SMITH BG., WRIGH PS. Clinical use of dental materials. Ed Masson SA. Barcelona, 1996.
- ANUSAVICE by PHILLIPS Science of dental materials. 11 ed. Ed Mc Graw Hill Interamericana, Barcelona, 2004.
- MACHI L. Dental materials. Ed Panamericana, Buenos Aires, 2007.

## **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](mailto:unidad.diversidad@universidadeuropea.es) at the beginning of each semester.