

1. BASIC INFORMATION

Course	General Microbiology and Immunology
Degree program	Dentistry
School	Biomedical Sciences and Health
Year	First year
ECTS	6
Credit type	Compulsory
Language(s)	Spanish and English
Delivery mode	Face-to-face
Semester	1st and 2nd
Academic year	2024/2025
Coordinating professor	Iris Azami Conesa

2. PRESENTATION

This subject is taught during the first and the second semester of the first year of the degree in Dentistry and is a compulsory subject of 6 ECTS.

The general objective of this course is the learning of the main mechanisms and components of our immune system and the acquisition of basic knowledge of Microbiology.

The aim of this course is to provide the knowledge of the main microorganisms and their role in the most frequent infectious diseases in humans, taking special attention in those related to the oral cavity. Likewise, the knowledge and skills acquired in the theoretical and practical part of the course will provide the student with the necessary basis to understand the mechanisms of action of antimicrobials.

In addition, the student is expected to master the concepts with a microscopic approach and to be aware of the importance of preventive measures in the development of infectious diseases.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB1: students have demonstrated knowledge and understanding of an area of study that is based on general secondary education and is often found at a level that, while supported by advanced textbooks, also includes some aspects that involve knowledge from the forefront of their field of study.
- CB2: students know how to apply their knowledge to their work or vocation in a professional way

and have the skills that are usually demonstrated through the development and defense of arguments and problem solving within their area of study.

- CB3: students have the ability to collect and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant social, scientific or ethical issues.
- CB5: students have developed the necessary learning skills to undertake further studies with a high degree of autonomy.

Cross-curricular competencies:

- CT1. Autonomous learning: 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 put into practice independently what they have learned. The autonomous student, in short, selects the best strategies to achieve her learning objectives.
- CT2. Self-confidence: Ability to assess our own results, performance and capabilities with the internal conviction that we are capable of doing things and the challenges that arise.
- CT5. Ability to apply knowledge to practice: Ability to use the knowledge acquired in the academic field in situations that are as similar as possible to the reality of the profession for which they are being trained, for example, through relating theoretical foundations with its application to real problems of daily life, to address problems and situations close to professional activity or to solve real questions and / or problems.
- CT7. Awareness of ethical values: Ability to think and act according to universal principles based on the value of the person that are aimed at their full development and that entails a commitment to certain social values.
- CT8. Information management: Ability to search, select, analyze and integrate information from various sources.
- CT9. Skills in interpersonal relationships: Relating positively with other people by verbal and non-verbal means through assertive communication, understanding by this, the ability to express or transmit what you want, what you think or feel without bothering, attacking or hurt the other.

Specific competencies:

A. Professional values, attitudes and ethical behaviors.

- GC1 - Know the essential elements of the dentist profession, including ethical principles and legal responsibilities.
- GC7 - Promote autonomous learning of new knowledge and techniques, as well as motivation for quality.
- GC9 - Understand the importance of maintaining and using records with patient information for subsequent analysis, preserving the confidentiality of the data

B. Scientific basis of dentistry. Acquisition and critical evaluation of information.

- CE11. To understand the basic biomedical sciences on which dentistry is based to ensure correct oral and dental care.
- CE14. To understand the general processes of disease, including infection, inflammation, immune system disorders, degeneration, neoplasia, metabolic alterations and genetic disorders.
- CE15. To be familiar with the general pathological features of diseases and disorders that affect the organic systems, specifically those that have oral repercussions.
- CE16. To understand the fundamentals of action, indications and efficacy of drugs and other therapeutic interventions, knowing their contraindications, interactions, systemic effects and interactions on other organs, based on the available scientific evidence.
- CE18. To know, critically evaluate and be able to use clinical and biomedical information sources to obtain, organize, interpret and communicate scientific and health information.
- CE19. To know the scientific method and to have the critical capacity to value the established knowledge and the new information. To be able to formulate hypotheses, collect and critically evaluate information for problem solving, following the scientific method.

Specific competences

- SC3: Know the biomedical sciences on which dentistry is based to ensure correct oral and dental care. Among these sciences have to include appropriate content in Microbiology and Immunology.
- The table below shows the relationship between the competencies developed in the subject and the learning outcomes pursued:

Learning outcomes:

- To know the structure, metabolism and genetics of microorganisms, the main bacteria, fungi, parasites and viruses that cause disease in humans and the infections they cause.
- To know the main antimicrobials, their mechanisms of action and general resistance mechanisms.
- To know the microbiology of oral infections and their systemic repercussions.
- Know the sampling techniques and transport systems used in dentistry and the main procedures and techniques used in clinical microbiology laboratories.

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

Competencies	Learning outcomes
CB1, CB2, CB3, CB5 CT1, CT2, CT5, CT12, CT8 GC7, GC11, GC14, GC15, SC3	LO1: To know the structure, metabolism and genetics of microorganisms, the main bacteria, fungi, parasites and viruses that cause disease in humans and the infections they cause.
CB1, CB2, CB3, CB5, CT1,CT2, CT5, CT8, GC7, GC11, GC14, GC15, GC18, GC19, SC3	LO2: To know the main antimicrobial agents, their mechanisms of action and general mechanisms of resistance.

CB1, CB2, CB3, CB5, CT1, CT2, CT5, CT7, CT8, CT9, GC1, GC7, GC9, GC11, GC14, GC15, GC18, GC19, SC3	LO3: To understand the microbiology of oral infections and their systemic implications
CB1, CB2, CB3, CB5, CT1, CT2, CT5, CT7, CT8, CT9, GC1, GC7, GC11, GC14, GC15, GC18, GC19, SC3	LO4: To know the sampling techniques and transport systems used in dentistry and the main procedures and techniques used in clinical microbiology laboratories.

4. CONTENT

MODULE I. GENERAL IMMUNOLOGY

1. Basic Concepts in the Immune System. Organs and main components
2. Natural and Adaptive Immunity
3. Humoral immunity
4. Cellular immunity

MODULE II. GENERAL MICROBIOLOGY

5. Bacterial morphology and structure
 - 5.1. Cell wall and cytoplasmic membrane
 - 5.2. Bacterial cytoplasm
 - 5.3. The genome
 - 5.4. Bacterial Facultative Structures
6. Bacterial metabolism and division
 - 6.1. Bacterial nutrition
 - 6.2. Catabolism and anabolism
 - 6.3. Growth of bacterial populations and bacterial cultures
7. Microbial genetics
 - 7.1. Mutations
 - 7.2. Transfer of genes and transposons
8. Antimicrobial chemotherapy
 - 8.1. Mechanisms of action of antimicrobials
 - 8.2. Mechanisms of bacterial resistance to antimicrobials
 - 8.3. Basis for the correct use of antimicrobials in dentistry
9. Host-bacteria relationships

- 9.1. Normal microbiota
- 9.2. Pathogenicity and virulence of bacteria
- 9.3. Koch's Postulates
- 10. General Mycology and Parasitology
 - 10.1. Classification and general characteristics of fungi
 - 10.2. Major parasites of clinical importance
- 11. General virology
 - 11.1. General characteristics of viruses
 - 11.2. Classification
 - 11.3. Pathogenesis of viral infection

MODULE III. IMPORTANT BACTERIAL GENERA IN HUMAN PATHOLOGY

- 12. *Staphylococcus* genera
- 13. *Streptococcus* and *Enterococcus* genera
- 14. Gram negative bacteria
 - 14.1. *Neisseria* genus
 - 14.2. *Enterobacteriaceae* family
 - 14.3. *Pseudomonas* genus
- 15. Anaerobic bacteria important in human pathology and dental microbiology
 - 15.1. *Clostridium* genus
 - 15.2. *Porphyromonas* genus
- 16. Facultative anaerobic bacteria of dental interest
 - 16.1. *Actinomyces* genus
 - 16.2. Other anaerobes of dental interest
- 17. Acid-resistant bacteria. Genus *Mycobacterium*
- 18. Spirochetes
 - 14.1 *Treponema* genus

MODULE IV. ORAL MICROBIOLOGY

- 19. Composition and ecology of oral microbiota
 - 19.1. Oral ecological determinants
 - 19.2. Physico-chemical factors
 - 19.3. Nutritional factors
- 20. Dental plaque
 - 20.1. Dental plaque composition

- 20.2. Microbiological principles for the control of dental plaque
- 21. Microbiology of caries
 - 21.1. Etiology and pathogenesis
 - 21.2. Control of etiologic factors of caries
- 22. Microbiology of gingivitis and periodontitis
- 23. Endodontic microbiology and infection-related processes
- 24. Systemic complications of oral infections

5. TEACHING-LEARNING METHODOLOGIES

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

- Master classes.
- Clinical Case.
- Cooperative learning.
- Problem-based learning.

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
Tutorials	5
Master classes	30
Asynchronous virtual master classes	10
Self-study and work	65
Knowledge tests	5
Case Analysis	12,5
Laboratory practices	10
Problem solving	12,5
TOTAL	150

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	60%
Case/ Problem	25%
Laboratory practices	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. Ordinary Call

To pass the subject in the ordinary session you must obtain a grade equal to or greater than 5.0 out of 10.0 in each of the evaluable activities of the subject.

In any case, the requirements detailed in the rubrics of the evaluable activities included in the Subject Work Plan section that appears on the virtual campus must be met, where the Specific Regulations of the Subject are also described.

7.2. Extraordinary Call

To pass the subject in the extraordinary call you must obtain a grade equal to or greater than 5.0 out of 10.0 in the evaluable activities that you did not pass in the ordinary call.

REGULATIONS FOR THE ASSESSMENT OF ACCREDITED UNDERGRADUATE DEGREES AT UNIVERSIDAD EUROPEA DE MADRID

CHAPTER I. COURSE ASSESSMENT SYSTEM FOR ACCREDITED UNDERGRADUATE DEGREES

Article 1 - 4. Continuous assessment

Students taking campus-based studies are required to demonstrate that they have attended at least 50% of their classes. Such attendance forms an essential part of the assessment process and is necessary to give the student the right to receive guidance, assistance and academic supervision from the professor. For such purposes, students must use the technological system put in place by the University to accredit their daily attendance at each of their classes. This system shall furthermore ensure that objective information is gathered regarding the active role of the student in the classroom. The failure to use the methods proposed by the University to demonstrate 50% attendance will give the professor the right to grade the course as a fail under the ordinary exam period. The foregoing does not affect

other requirements of higher attendance percentages that each school may establish in their teaching guides or internal regulations.

Therefore, it is the authority of the professor that students who have not fulfilled the 50% of attendance in the ordinary call must pass all the evaluation tests in the extraordinary call, for which they must obtain a grade greater than or equal to 5.0 out of 10.0 in all of them (Faculty Board 11-07-23).

Article 6 - 12. Final grades

Any student that uses or benefits from unlawful means during an evaluation test or that unduly attributes the author of the academic work required for the assessment will be graded as a “fail” (0) and may similarly be the object of a sanction, subject to the opening of disciplinary proceedings. In the case of the Final Graduation Project, the plagiarism or the lack of originality of the project, will automatically be graded as a “fail” (0) in the corresponding course in both ordinary and extraordinary periods. Likewise, the student will lose their status as a student during six months according with the General Standards for Graduation Projects and Master’s Thesis in its Article 5.

https://universidadeuropea.com/resources/media/documents/6_Reglamento_evaluacion_titulaciones_oficiales_grado_UEM_v2.pdf

8. SCHEDULE

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

Assessable activities	Deadline
Activity 1. Scientific publication analysis	Weeks 6-7
Activity 2. First midterm exam (objective knowledge test)	Weeks 7-8
Activity 3. Laboratory practices	Weeks 8-10
Activity 4. Problem solving	Weeks 11-12
Activity 5. Cases analysis	Weeks 13-14
Activity 6. Second midterm exam (objective knowledge test)	Weeks 19-20

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

The recommended Bibliography is:

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- Prescott LM, Harley JP, Klein DA, Gamazo de la Rasilla C, Lasa Uzcudum Í. Microbiología. 2ª ed. Editorial: McGraw-Hill Interamericana de España; 2004.
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10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.

4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:

orientacioneducativa@universidadeuropea.es

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.