1. OVERVIEW

Subject Area	Immunology
Degree	Bachelor's Degree in Biotechnology
School/Faculty	School of Biomedical and Health Sciences
Year	3
ECTS	6 ECTS
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On campus
Semester	S1
Academic Year	2024-2025
Coordinating professor	Alejandro Barriga Torrejón
Teacher	

2. INTRODUCTION

Immunology is one of the compulsory subjects in the Degree in Biotechnology syllabus at the Universidad Europea de Madrid. This subject forms part of the traditional guiding principles in the learning of future graduates in Pharmacy and Pharmacy-Biotechnology. It provides a solid base in Immunology, included in Module V of the 11 contained in the degree course.

Immunology belongs to the Biology of Systems and Physiological Integration module and is part of the ECTS corresponding to subjects in the branch of Health Sciences. This module is taught over 2 years in the degree course (years 3 and 4) and includes core and compulsory subjects. It is important to highlight that this module covers subjects associated with physiology and pharmacology and provides knowledge necessary for understanding of the human body and the effects of drugs on it. It includes the basics of immune response - a skill in this subject - and the study of cell cultures and tissue engineering.

Students will understand and be able to apply the knowledge obtained on this course in the context of how the immune system works. It is important to determine what the immune responses are to different microorganisms, be they bacteria or viruses. This is important because after infection, we protect ourselves for life against the same microorganism which caused the infection. We will study the origin of vaccinations and establish the molecular bases of diseases which originate in the faulty operation of the immune system (immune deficiencies, hypersensitivity, autoimmunity and transplant rejection). Finally, students will gain deeper understanding of the therapeutic strategies aimed at enhancing the immune system, such as monoclonal antibodies, recombinant cytokines for tumours or autoimmune disorders and recent therapies based on lymphocytes modified with modified lymphocytes with CAR-T for the treatment of different neoplasia.

3. LEARNING OUTCOMES (RA, by the acronym in Spanish)

Knowledge (CON, by the acronym in Spanish)

CON02. Recognise the structure, organisation and function of tissues, organs and systems, viruses and cells, as well as the processes which occur in them. Identify the immune response mechanisms of the organism.

- Understand the concepts related to innate/acquired immunity.
- Understand the cellular and molecular basis of immunological tolerance, immune deficiencies and autoimmune disorders.

Abilities (HAB, by the acronym in Spanish)

HAB04. Design experimental procedures and protocols choosing the most suitable technique in the field of biotechnological research, all the while meeting quality and legislative standards.

- Manage the basic concepts and the specific terminology required in immunology.
- Apply immunological analysis techniques and experimental methods to study the humoral response.

Skills

COMP02. Identify and describe the structure and function of the different types of cells both in unicellular and pluricellular organisms.

COMP10. Apply basic immunochemical techniques and interpret their results.

4. CONTENTS

· Introduction to immunology.
· Physiology of the immune system: cells, organs and tissues.
· Mechanisms of the immune response. Molecular bases of the pathophysiology of the immune system.
· Immunity against infections: bacteria, viruses, parasites. Prophylaxis and vaccination.
· Alterations to the immune system: hypersensitivity, autoimmunity, immunodeficiency, etc.
· Transplants and rejection. Immunosuppressive drugs.
· Different immunological disorders. Therapeutic strategies.
· Immunomodulatory drugs in autoimmune diseases.
· Qualitative and quantitative immunological techniques

1. Introduction to immunology.
2. Physiology of the immune system: cells, organs and tissues.
3. Mechanisms and molecular basis of the immune response.
   3.1. Phagocytic cells.
   3.2. Complement system.
   3.3. Antibodies.
   3.4. Antigen presentation.
   3.5. T Cells.
   3.6. B Cells.
   3.7. Adhesion molecules.
   3.8. Cytokines.
4. Mechanisms of genetic variability of the immune system.
5. Introduction to alterations of the immune system: hypersensitivity, autoimmunity, immunodeficiencies.
6. Immunomodulatory drugs.
7. Effect of the immune system on therapy.

8. Biotechnological techniques based on immunology.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture.
- Collaborative learning.
- Learning based on workshop teaching

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Lectures	32
Asynchronous master lectures	18
Debates and discussions	6
Case Studies	10
Spoken presentations	3
Tutorials	15
Independent working	50
Workshops and/or lab work	10
On-site knowledge tests	6
TOTAL	**150**

7. ASSESSMENT

The assessment methods, together with how much they each count towards the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
On-campus knowledge tests	60%
Spoken presentations	15%
Case study/problem scenario	10%
Laboratory work	15%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment

activities and the deadlines and assessment procedures for each activity.

7.1. Ordinary exam period

To pass the subject area in the ordinary exam period you must obtain a mark of 5.0 or more out of 10.0 in all assessed parts of the subject. Any part you do not pass in the ordinary exam period will need to be recovered in the extraordinary exam period (resits).

Your final grade will be the average of the partial marks in each of the learning activities you have passed. The continuous assessment system for the learning activities requires attendance to at least 50% of the classes.

It is compulsory for students studying degrees on-campus to accredit attendance to at least 50% of classes. This requirement qualifies students for the right to obtain academic counselling, support and monitoring from the professor. Failure to accredit attendance to at least 50% of the classes by any of the means proposed by the University will mean that the professor awarding a fail to the student for that subject area in the ordinary exam period in accordance with the grading system outlined in these regulations. All of the above, without prejudice to the other requirements or higher attendance percentages that other faculties may stipulate in their learning guides or internal regulations. Regulations for the assessment of official degree programmes, Art. 1 point 4.

(*https://universidadeuropea.com/documents/1798/6. Reglamento_evaluacion_titulaciones_oficiales_grado_UEM_v2.pdf*)

7.2. Extraordinary exam period (resits)

To pass the subject area in the extraordinary exam period (resits), the students must obtain a mark equal to or above 5.0 out of 10.0 in all parts of the subject assessment they did not pass during the ordinary exam period.

The student must submit the activities not passed in the ordinary exam period taking into account the corrections or comments made by the teacher. The student must also submit any activities which were not submitted.

The final grade will be the average of the partial marks in each of the activities passed (with a mark equal to or higher than 5 out of 10). The marks for the assessable activities the student passed in the ordinary exam period will be maintained for calculating this grade.

8. TIMELINE

The timeline with delivery dates of assessable activities in the subject area is indicated in this section:

Assessable activities	Date
Online questionnaire 1	Week 4
Online questionnaire 2	Week 6
Objective test 1	Week 9
Laboratory work	Week 7, 15
Online questionnaire 3	Week 14
Group Spoken presentations of clinical cases	Week 4-15
Objective test 2	Week 17-18

The timeline may be subject to modifications for logistical reasons of the activities. Students will be informed of any changes in due time and course.

9. BIBLIOGRAPHY

The reference work for following this subject area is:

- AK Abbas. Cellular and molecular immunology. Ed. Saunders.

The recommended bibliography is indicated below:

- Jose R. Regueiro. Inmunología, Biología y patología del sistema inmune. Ed. Panamericana.
- Janeway´s Immunobiology. Ed. Garlan Science
- Roitt´s essential immunology. Ed. Wiley

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

The Educational Guidance and Diversity Unit (ODI in Spanish) offers support throughout your time at university to help you with your academic achievement. Other cornerstones of our educational policy are the inclusion of students with special educational needs, universal access in all our university campuses and equal opportunities.

This ODI unit offers students:

1. Support and monitoring through counselling and personalised student plans for those who need to improve their academic performance.
2. Curricular adaptations to uphold diversity, with assistance for those students who require specific educational support, leading to equal opportunities without significant changes to methodology or evaluation.
3. We offer students a range of extracurricular educational resources to reinforce skills which will enhance their personal and professional development.
4. Career guidance by offering tools and advice to students with doubts regarding their professional careers or those who believe they have chosen the wrong line of study.

Students who need educational support can contact us at: orientacioneducativa@universidadeuropea.es

11. SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degree courses and the learning process.

These surveys will be available in the surveys area of your virtual campus or by email.

Your opinion is essential to improve the quality of the degree. Many

thanks for taking part.