

**COURSE DATA****DATA SUBJECT**

Code: 36854
Name: Immunology
Cycle: Undergraduate Studies
ECTS Credits: 4.5
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1106 - Degree in Biology	Facultat de Ciències Biològiques	4	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1106 - Degree in Biology	Optatividad	ELECTIVES

COORDINATION

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SUMMARY

The Immunology course is offered in the fourth and final year of the Bachelor's Degree in Biology at the University of Valencia. It is an elective course taught during the second semester. The aim of the Immunology syllabus is to introduce students to the general principles of the body's defense mechanisms. The course covers the cellular and molecular bases of innate and adaptive immunity, enabling students to understand the mechanisms involved in immune recognition, activation, maturation, and effector functions. It also examines the mechanisms underlying diseases caused by alterations in the immune response. Finally, students become familiar with the main techniques used in immunological and serological diagnostic laboratories.

PREVIOUS KNOWLEDGE**RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE**

There are no specified enrollment restrictions with other subjects of the curriculum.

COMPETENCES / LEARNING OUTCOMES



1106 - Degree in Biology

Design and conduct experiments by using scientific techniques and instruments appropriately and complying with laboratory safety regulations.

Interpret, analyse, evaluate, process and synthesise biological data and information by applying mathematical and statistical methods.

Organise, plan and manage information in a manner that allows the individual to analyse, synthesise and develop critical reasoning that can be applied to solve problems, make decisions and carry out work.

Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.

Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.

Understanding the molecular, cellular, and histological bases of innate and specific (humoral and cellular) immune responses, as well as the biological bases of immune system dysfunctions and strategies for their treatment.

DESCRIPTION OF CONTENTS

1. INTRODUCTION TO IMMUNOLOGY

Topic 1. Overview of immune responses.

Topic 2. Hematopoiesis and cells of the immune system. Organs and tissues of the immune system: anatomical basis of the immune response.

Topic 3. Innate immunity. Phagocytes and their receptors.

2. ANTIGEN RECOGNITION

Topic 4. Antigens and antibodies. Structure of immunoglobulins. Isotypes. The B-cell receptor. Generation of antibody diversity.

Topic 5. T lymphocytes and the T-cell receptor. Accessory molecules. Generation of receptor diversity. Antigen-presenting molecules: the Major Histocompatibility Complex (MHC) and CD1 molecules. Antigen processing and presentation to T lymphocytes.



3. LYMPHOCYTE MATURATION AND REGULATION

Topic 6. B-lymphocyte differentiation. B-cell tolerance.

Topic 7. T-lymphocyte differentiation. T-cell tolerance.

4. EFFECTOR MECHANISMS OF IMMUNE RESPONSES

Topic 8. Immune signalling: cytokines and their receptors.

Topic 9. Effector mechanisms of cell-mediated immunity. Generation of effector helper T (Th) and cytotoxic T (Tc) lymphocytes. Natural killer (NK) cells and their receptors. Macrophage activation.

Topic 10. Effector mechanisms of humoral immunity. The complement system. Generation of effector B lymphocytes. Mucosal immune responses.

Topic 11. The inflammatory response. Adhesion molecules and their ligands. Leukocyte trafficking.

Topic 12. Immunity to pathogens.

5. THE IMMUNE SYSTEM IN DISEASE

Topic 13. Defects of immunity: immunodeficiencies. Excessive immune responses: allergies and other hypersensitivity reactions.

Topic 14. Errors of immunity: autoimmunity. Adverse consequences of immunity: alloimmunity and transplant rejection.

6. PRACTICAL CLASSES

(i) Quantification of the phagocytic capacity of macrophages by flow cytometry.

(ii) Double immunodiffusion (Ouchterlony) assay: a qualitative or semi-quantitative technique used to detect specific antibodies and antigens present in serum samples.

(iii) Indirect ELISA (enzyme-linked immunosorbent assay) for the quantification of specific antibodies in serum, and competitive ELISA for the quantification of antigens.

WORKLOAD

**PRESENCIAL ACTIVITIES**

Activity	Hours
Tutorials	2,00
Theory	28,00
Laboratory	15,00
Total hours	45,00

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	67,50
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	67,50

TEACHING METHODOLOGY

The course is organized as follows:

1. **Lectures:** One-hour lectures delivered by the teaching staff to cover the theoretical contents of the syllabus. Students are expected to read the corresponding chapters or sections of the recommended textbooks, as indicated in the Study Guides, before attending each lecture. Attendance at lectures is optional.
2. **Practical classes (laboratory sessions):** Laboratory sessions are conducted according to the practical syllabus. Students are required to read the laboratory manual provided by the teaching staff in advance. Attendance at all laboratory sessions is compulsory. Students who fail to attend 20% or more of the practical sessions will not be eligible to pass the course.
3. **Problem-based learning:** Group tutorial sessions focused on solving exercises and addressing students' questions in preparation for examinations. These sessions include worked examples and discussion of model examination questions. Attendance at these sessions is optional.

EVALUATION

The assessment of the knowledge and skills acquired will be based on methods that provide an objective and comparable measure of student achievement, with documented results. Accordingly, assessment will be carried out through written examinations.

The final examination will consist of the following components:

- **Theory examination:** 80 marks.



- **Practical examination:** 20 marks.

A minimum score of **50 out of 100 marks** is required to pass the course.

Attendance at the laboratory practical sessions is compulsory. Students must attend at least **80% of the practical sessions** to be eligible to sit the practical examination.

REFERENCES

- Inmunología. Biología y patología del sistema inmunitario (5ª Edición). Regueiro González y col. Editorial Médica Panamericana, 2022.
- Inmunología Celular y Molecular (10ª Edición). Abbas, Abul K y col. Ediciones Elsevier, 2022. Disponible en la plataforma e.Library de la Universitat de València.
- Inmunología. Fundamentos (12ª Edición). Roitt, Ivan y col. Editorial Médica Panamericana, 2014.
- Inmunología de Kuby. (8ª Edición). Kindt, Thomas y col. Editorial McGraw-Hill Interamericana, 2020. Disponible como libro electrónico en la Universitat de Valencia.
- Inmunología (10ª edición). David Male y col. Ediciones Elsevier, 2026.
- "Inmunología" (La revista de la Sociedad Española de Inmunología).
- Specialized scientific review journals: Annu. Rev. Immunol., Nat. Rev. Immunol., Curr. Opin. Immunol., Immunol Rev. y Trends Immunol.