

**COURSE DATA****DATA SUBJECT****Code:** 34087**Name:** Pharmacology I**Cycle:** Undergraduate Studies**ECTS Credits:** 6**Academic year:** 2026-27**STUDY (S)**

Degree	Center	Acad. year	Period
1201 - Degree in Pharmacy	Facultat de Farmàcia i Ciències de l'alimentació	3	Second quarter
1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics	Facultat de Farmàcia i Ciències de l'alimentació	3	Second quarter

**SUBJECT-MATTER**

Degree	Subject-matter	Character
1201 - Degree in Pharmacy	Pharmacology	COMPULSORY
1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics	Asignaturas obligatorias del PDG Farmacia-Nutrición Humana y Dietética	COMPULSORY

**COORDINATION**

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**SUMMARY**

The subjects Pharmacology I and Pharmacology II have 15 credits (6 + 9) in the curriculum and are taught in two consecutive years, the second semester of third year and both semesters of fourth year in the Bachelor's Degree in Pharmacy.

Pharmacology is the science that studies the actions and properties of drugs in organisms, understood as drug any chemical used in the treatment, prevention or diagnosis of a disease, or to avoid the appearance of an unwanted physiological process. Bearing in mind this general definition, in Pharmacology I students will first learn the general principles of drug action (general Pharmacology), and will continue with the detailed study of the pharmacological groups acting at the Central Nervous System and at the inflammatory and immunological process. This study will be completed with the subject Pharmacology II (4th year of the Degree in Pharmacy) with drugs that act on the rest of the physiological systems (Autonomous Nervous System, cardiovascular, respiratory, digestive...). The basic theoretical knowledge of drugs is complemented with practical lessons of experimental Pharmacology in the laboratory, as well as virtual simulations.



It is noteworthy that the focus of the subject and the competencies to be achieved by the students integrate the Sustainable Development Goals (SDG) promoted by the United Nations (Sustainable Development Goals (SDG) Agenda). Among them, the Rational Use of Medicines and the promotion of Community Health (Objective 3: Health and Well-being) and quality Education (Objective 4) stand out for their direct relationship with our subject. In addition, the first part of Pharmacology I also deals with aspects related to SDG 5 (Gender equality) and 10 (Reduction of inequalities), by addressing the differences in the response to drugs according to gender and access to medicines for the entire population.

## PREVIOUS KNOWLEDGE

### RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

### OTHER REQUIREMENTS

Students must have acquired knowledge of Pathophysiology, Biochemistry, Physiology and Pharmacokinetics necessary to understand the actions of drugs and their therapeutic effects.

## COMPETENCES / LEARNING OUTCOMES

### 1201 - Degree in Pharmacy

Acquire basic concepts in pharmacology (concept of drug, agonist, antagonist, mechanism of action, pharmacological action and interactions, etc.).

Act with autonomy in learning, making informed decisions in different contexts, issuing judgements based on experimentation and analysis, and transferring knowledge to new situations.

Collaborate effectively in work teams, assuming responsibilities and leadership roles and contributing to collective improvement and development.

Contribute to the design, development and implementation of solutions that respond to social demands, taking into account the Sustainable Development Goals as a reference.

Demonstrate critical and self-critical thinking in the field of the degree programme, considering aspects such as professional ethics, moral values and the social implications of the different activities carried out.

Develop communication and information skills, both oral and written, to deal with patients and other health professionals in the centre where professional activity is carried out. Promote teamwork and collaboration skills in multidisciplinary teams and wi

Develop skills to update knowledge and undertake further studies, including pharmaceutical specialisation, scientific research, technological development and teaching.

Know and understand, within the field of the degree programme, gender inequalities in society; integrate different needs and preferences based on sex and gender into the design of solutions and problem solving.

Know and understand the different mechanisms by which drugs exert their pharmacological actions and



effects.

Know how to communicate effectively, both orally and in writing, adapting to the characteristics of the situation and the audience.

Know how to interpret, evaluate and communicate relevant data in the different areas of pharmaceutical activity, using information and communication technologies.

Know pharmacological actions and relate them to therapeutic effects and adverse reactions.

Know the basic concepts of toxicology.

Know the indications and contraindications of medicines, as well as dosage and precautions for use.

Know the methodology for evaluating substances with pharmacological activity in experimental pharmacology (in vitro and in vivo).

Module: Medicine and Pharmacology. Evaluate the effects of substances with pharmacological activity.

Module: Medicine and Pharmacology. Know and understand the techniques used in the design and evaluation of preclinical and clinical trials.

Possess and understand knowledge in the different areas of study included in pharmacist training.

Propose creative and innovative solutions to complex situations or problems within the field of knowledge, to respond to diverse professional and social needs.

Relate the physicochemical characteristics of medicines with their pharmacokinetic and pharmacodynamic properties.

Transmit ideas, analyse problems and solve them with critical spirit, acquiring teamwork skills and assuming leadership when appropriate.

## DESCRIPTION OF CONTENTS

### 1. INTRODUCTION TO PHARMACOLOGY

To facilitate a progressive learning process, the programme is structured starting from generic and basic concepts of this discipline to more specific ones. It starts with an introductory chapter on the subject.

Chapter 1-Introduction. Basic concepts. (1 h)

The main aim of this chapter is to familiarise students with scientific terminology of the subject and its importance for their training as pharmacists. We include in this chapter the basic principles of the discipline, the most relevant bibliographic sources and those relevant aspects useful to the student who embraces for the first time the learning of this discipline. This chapter contains a brief historical review of Pharmacological Sciences, explains the fundamental concepts to be handled throughout the semester and



justifies the programme structure and the evaluation criteria to be applied.

Contents:

- Definition of Pharmacology.
- Concept of drug, medicine, active ingredient, proprietary medicinal product and drugs in the context of Pharmacology.
- Access to medicines; essential medicines.
- Brief historical introduction.
- Development and current objectives.
- Importance within the Pharmacy studies.
- Classification of the Pharmacological Sciences.
- Teaching plan of Pharmacology I.
- General Bibliography: textbooks and consultation, magazines and other sources.

## **2. GENERAL PHARMACOLOGY**

This thematic unit describes first the basic principles of action of drugs in the body, in order to understand their interaction with cellular structures and the quantification of its pharmacological response. Next it addresses the various factors that modulate drug responses, starting with the pharmacokinetic factors that will determine the access of the drugs to their places of action, the onset of action and dosage regimens to get the desirable (therapeutic effects), followed by the other causes of variations to the response, as well as basic principles of drug interactions and undesirable (adverse) effects of drugs. Possible differences in response to drugs between men and women, and their consequences, will also be addressed.

At the end of this training unit, students must understand how the physicochemical characteristics of drugs determine its pharmacokinetic properties and how interactions at the molecular level of drugs with different cellular and extracellular components trigger both desirable and undesirable effects.

Chapter 2.- Mechanisms of action of drugs I. Basic principles of Molecular Pharmacology.

Chapter 3.- Mechanisms of action of drugs II: Main signaling pathways.

Chapter 4.- Evaluation of the pharmacological response. Drug-receptor interaction.

Chapter 5.- Pharmacokinetic aspects that modulate the pharmacological response.

Chapter 6.- Pharmacological interactions.

Chapter 7.- Variations in drug response.

Chapter 8.- Drug security. Adverse reactions. Pharmacovigilance.



### **3. PHARMACOLOGY OF THE CENTRAL NERVOUS SYSTEM**

This thematic unit and the following intend that the student learns the scientific principles of a part of the current pharmacological therapy and its future perspectives. Drugs are explained grouped according to their level of performance, establishing analogies and differences between them, thereby facilitating their learning. The syllabus addresses not only their pharmacological actions, but also their adverse reactions, contraindications and precautions to be taken into account for their proper use.

Chapter 9.- Anxiolytic and hypnotic drugs.

Chapter 10.- Antidepressants and drugs to treat mania.

Chapter 11.- Antiepileptic drugs. Central skeletal muscle relaxant drugs.

Chapter 12.- Antipsychotic drugs.

Chapter 13.- Antiparkinsonian drugs. Treatment of Alzheimer's disease.

Chapter 14.- Opioid analgesics.

Chapter 15.- Local anaesthetics.

Chapter 16.- General anaesthetics.

Chapter 17.- Psychostimulants.

Chapter 18.- Treatment of drug dependences.

### **4. PHARMACOLOGY OF INFLAMMATION AND IMMUNITY**

Chapter 19.- Antihistaminic drugs.

Chapter 20.- Eicosanoids and non-steroidal anti-inflammatory drugs (NSAIDs).

Chapter 21.- Glucocorticoids.

Chapter 22.- Pharmacotherapy of pain.

Chapter 23.- Immunomodulators.

Chapter 24.- Pharmacotherapy of multiple sclerosis.

Chapter 25.- Pharmacotherapy of inflammatory bowel disease.

Chapter 26.- Pharmacology of rheumatoid arthritis and osteoarthritis.



Chapter 27.- Drugs used in hyperuricemia and gout.

Chapter 28.- Dermatological pharmacology.

## 5. PRACTICAL LESSONS

The practical program is closely related to the content of the four thematic units taught in lectures. Therefore, it starts with an Introduction to Experimental Pharmacology and its significance in the development of new drugs. Thereafter the contents of the practical lessons carried out in laboratory are structured into three modules:

Module 1: Analysis of the functional drug-receptor interaction: agonism & competitive antagonism.

Module 2: Pharmacology of the central nervous system: Neuropharmacological screening tests

Module 3: Study of analgesic and anti-inflammatory drugs.

## WORKLOAD

### PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	2,00
Theory	40,00
Seminar	4,00
Laboratory	15,00
<b>Total hours</b>	<b>61,00</b>

### NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	2,00
Individual or group project	10,00
Independent study and work	37,00
Preparation of lessons	14,00
Preparation for assessment activities	18,00
Resolution of case studies	5,00
<b>Total hours</b>	<b>86,00</b>

## TEACHING METHODOLOGY

The subject is designed to facilitate the teaching-learning process and is structured in different classroom activities, coordinated throughout the semester to provide an overview as complete as possible of the developed topic:



\* **Theoretical Lessons.**- The students should acquire basic knowledge covered by the syllabus through lecture attendance and personal study. In these lessons, the teacher gives an overview of the topic object of study focusing on the most relevant and complex aspects. To facilitate personal study and preparation of the issues in depth, the proper literature and necessary support material will be indicated or provided to students through the Virtual Classroom; self-correcting questionnaires will be made available as well, so they can assess their level of knowledge and understanding of the programme.

\* **Seminars.**- Seminars allow a more active involvement of students to be held in groups of 40 students maximum. It is one of the methodologies that will allow us to work cross-cutting skills. In the seminars students will carry out different types of activities: movie- forum, debates, crossword pharmacological analysis of readings, press reports... Students, gathered in groups of 4-5 students, will prepare the necessary material for the activity to be carried out which will be always related to the contents of Pharmacology I. In coordination with other subjects in the 3rd year of the degree, multidisciplinary seminars, which may cover also topics related to other areas, could be proposed in order to enable the student to relate and integrate concepts learned in the various subjects. In these seminars students will exercise or acquire the capability to search, outline and summarize information and the ability to respond to questions raised in public and defend judgments about scientific matters, in addition to encourage teamwork.

\* **Laboratory Practical Lessons.**- Laboratory lessons are carried out in 4 sessions and are related to the theoretical aspects of the various pharmacological groups studied in Pharmacology I. At the beginning of each session, the Professor will point the most important aspects of experimental work and will assist the student during the session. Once the experimental part is carried out, the students will analyse the observed facts and will resolve some issues raised by the teacher at the beginning of the session or during the development of the practical lesson. At the last session students will take a practical exam.

\* **Tutorials.**- Tutorials are organized in small groups of students, according to the established timetable. In these sessions, the tutor will evaluate the learning process of the students in a global way. The tutor may raise specific issues of greater complexity to the ones undertaken in regular seminars according to the needs of the students either individually or collectively. Besides, the tutorials will serve to solve doubts that might arise during the lectures and to advise students on strategies to circumvent difficulties that might encounter.

## EVALUATION

All aspects set out in the section on methodology of this guide will be considered in the assessment of student learning and you will take place in a continuous manner by the professor.

- **70% of the grade:** will come from the score of the theoretical exam
- **15% of the grade:** will come from the score obtained in practical lessons, which will be compulsory. The score will take into account both the participation and performance in the laboratory (40%) and the marks of the practical exam (60%). Practical lessons are mandatory and in case that a student fails the subject the year in which they were taken, the score will be maintained only for the following year.
- **15% of the grade:** will come from the evaluation of the work done and presented in



seminars, tutorials, lectures and other programmed activities in the virtual classroom.

It is an essential requirement to pass the subject to have taken and passed the practical lessons and the theoretical exam.

COMPULSORY ATTENDANCE is required for practical lessons, which are, therefore, NON-RECOVERABLE, in accordance with the provisions of article 6.5 of the UV Evaluation and Qualification Regulations for Bachelor's and Master's degrees.

According to Article 28 of the Language Use Regulations of the University of Valencia (<https://www.uv.es/llengues/rul>), students have the right to use either Valencian or Spanish in exams, assignments, presentations, and tutorials, regardless of the teaching language, except in courses taught in English where its use is specified.

Manifest plagiarism or copying of any task that is part of the evaluation will mean the impossibility of passing the subject, being subjected to the appropriate disciplinary procedures. Keep in mind that, in accordance with article 13. d) of the University Student Statute (RD 1791/2010, of December 30), it is the duty of a student to refrain from the use or cooperation in fraudulent procedures in the evaluation tests, in the work carried out or in official documents of the university. In the event of fraudulent practices, the procedure determined by the **Protocol of action in the event of fraudulent practices at the University of Valencia** (ACGUV 123/2020) will be followed: <https://www.uv.es/sgeneral/Protocols/C83sp.pd>

A student that has participated in various educational activities, but has not taken the theoretical exam, will obtain the rating of "not presented" in the first call of the course. Thereafter, and under similar circumstances, the score may be **Failed**. The assessment of seminars, tutorials, assistance and other activities will not be retained for the following academic year.

## REFERENCES

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- Fernández Alonso S, Ruiz Gallo M. Fundamentos de Farmacología básica y clínica 3ª ed.,



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- Agencia Española de Medicamentos y Productos Sanitarios: <https://www.aemps.gob.es/>
- European Medicines Agency: [www.ema.europa.eu/](http://www.ema.europa.eu/)
- International Vademecum: [www.vademecum.es/](http://www.vademecum.es/) (en línea a través del aula virtual)
- e-libros disponibles a través del Servicio de Biblioteca y Documentación de la Universidad de Valencia: <http://trobes.uv.es/>