COURSE DATA

DATA SUBJECT

Code: 34088
Name: Pharmacology II
Cycle: Undergraduate Studies
ECTS Credits: 9
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1201 - Degree in Pharmacy	Facultat de Farmàcia i Ciències de L'alimentació	4	Annual
1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics	Facultat de Farmàcia i Ciències de L'alimentació	4	Annual

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

HERRERO CERVERA MARÍA JOSÉ

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, inflammatory and immunological processes and neoplasms. This study will be completed wit 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,...). Fundamental knowledge of the drugs at the theoretical level is complemented with practical lessons in the laboratory of experimental Pharmacology, as well as simulation of experiments using computer programs.

The 9 credits of Pharmacology II, are distributed as follows: 56 h of theory (lectures two days a week throughtout the year), 15 h of practical classes, 6h of seminars, 4h in group tutorials and 9 h in evaluation.

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. Besides, students must study Pharmacology I, In order to understand the contents of Pharmacology II. It is not possible to do both together, because temporally are coincident.

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. PHARMACOLOGY OF AUTONOMOUS SYSTEM

Automic drugs. Review of autonomic physiology and introduction to autonomic pharmacology
Unit 1.- Drugs Acting on the Sympathetic Nervous System. Adrenoceptor agonists and antagonists
Unit 2.- Cholinergig transmission. Muscarinic Cholinergic agonists and antagonists
Unit 3.- Ganglionic blockers. Neuromuscular- blocking drugs. Anticholinesterases
Unit 4.- Ocular Pharmacology

2. PHARMACOLOGY OF BLOOD

Drugs with important actions on blood. Agents used in anemias and hematopoietic growth factors. Drugs used in coagulation disorder. Drugs used in the treatment of hyperlipidemias..
Unit 5 .- Drugs acting on the hematopoietic system
Unit 6 .- Pharmacology of hemostasis and fibrinolysis
Unit 7 .- Antiplatelet
Unit 8 .- Anticoagulants
Unit 9 .- Pharmacotherapy of atherosclerosis

3. PHARMACOLOGY OF RENAL AND CARDIOVASCULAR SYSTEM

Topics in this module are devoted to drugs that primarily act on the kidney and heart. Examines its therapeutic use in cardiovascular diseases primarily hypertension, myocardial ischemia, heart failure, peripheral vascular, etc.
Unit 10.- Diuretic drugs
Unit 11 .- Drugs acting on the renin-angiotensin-aldosterone
Unit 12 .- Calcium-channel blocking agents
Unit 13 .- Vasodilator drugs
Unit 14 .- Hearth function: Antiarrhythmic drugs.Positive inotropic drugs
Unit 15. - Pharmacotherapy of systemic arterial hypertension. Pulmonary hipertension. Portal hypertension
Unit 16 .- Pharmacotherapy of ischemic heart disease
Unit 17. - Pharmacotherapy of heart failure
Unit 18 .- Pharmacotherapy of vascular insufficiency, shock and hypotensive states

4. PHARMACOLOGY OF GASTROINTESTINAL SYSTEM

This module examines those drugs used in disorders related to the digestive tract such as peptic ulcer, diarrhea, constipation, biliary tract disease, pancreatic, intestinal inflammation, etc.
Unit 19 .- Pharmacotherapy of gastric, hepatobiliary and pancreatic exocrine.
Unit 20 .- Pharmacotherapy of gastrointestinal motility and vomiting. Laxatives and anti-diarrhea drugs.

5. PHARMACOLOGY OF RESPIRATORY SYSTEM

We study the drugs useful in the treatment of asthma, chronic obstructive pulmonary disease, mucolytic and antitussive drugs.
Unit 21.- Bronchodilators and antiasthmatic drugs,

Unit 22.- Antitussive drugs. Expectorants and mucolytics. Antifibrotic drugs

6. PHARMACOLOGY OF ENDOCRINE SYSTEM

Review of physiological endocrine system, hormones and regulatory mechanisms. Specific drugs are studied in this system applicable to many diseases of endocrine origin such as diabetes mellitus, hypothyroidism, etc. and other applications such as oral contraceptives, anti-inflammatory drugs.
Unit 23. - Pancreatic hormones. Pharmacotherapy of diabetes mellitus
Unit 24. ¿ Pharmacology of hypothalamic and pituitary hormones.Neurohypophysis hormones.
Unit 25. Adrenal Pharmacology. Pharmacology of growth hormone
Unit 26. Pharmacology of Thyroid. Antithyroid drugs
Unit 27.-Pharmacology of reproduction and sexual hormones. Gonadotropins. Prolactin
Unit 28. - Pharmacology of androgens
Unit 29. - Pharmacology of estrogens and progestins
Unit 30. - Contraceptives. Pharmacotherapy of infertility. Other
Unit 31. Pharmacology of bone metabolism. Pharmacotherapy of osteoporosis

7. PHARMACOLOGY OF INFECTIOUS PROCESSES

This module examines the different groups of antimicrobial and antiparasitic agents, specifying their mechanisms of action, spectrum, adverse reactions, therapeutic indications and emphasizes the rational use of them, emphasizing the serious problem of resistance to anti-infectives and lack of solutions to health problems like malaria or tuberculosis.
Unit 32 .- Basic principles of antimicrobial therapy.
Unit 33 .- Antibiotics that interfere with the synthesis of bacterial cell wall: Beta-lactam antibiotics, glycopeptides and other. Agents that alter the permeability of cell membrane.
Unit 34 .- Antibiotic inhibitors of protein synthesis in bacteria: Aminoglycosides. Macrolides. Tetracyclines. Others.
Unit 35 .- Antifolate drugs: Sulfonamides. Trimethoprim
Unit 36 .- Antibacterials that modify nucleic acids: Quinolones and others
Unit 37 .- Antimycobacterial drugs.
Unit 38 .- Pharmacotherapy in bacterial infections.
Unit 39 .- Antifungal drugs. Pharmacotherapy of fungal infection.
Unit 40 .- Antiprotozoal drugs. Anthelmintics and ectoparasiticides drugs.
Unit 41 .- Antiviral Drugs. Pharmacotherapy of viral infections.

8. PHARMACOLOGY OF ONCOLOGICAL DISEASES

Classification of antineoplastic drugs. Cytotoxic drugs. Antimetabolites. Inhibitor of mitosis. Topoisomerases inhibitors. Alkylating agents. Antibiotics. Hormonal agents. Monoclonal antibodies. Other antineoplastic compounds. New perspectives in cancer treatment. An overview of antineoplastic therapy. Aim of the therapy. Examples of treatment regimens. Palliative messures and supportive pharmacotherapy.
Chapter 42.- Antineoplastic drugs.
Chapter 43.- Cancer Chemotherapy. Advanced therapies

10. PHARMACOLOGY II PRACTICE

This module includes the development of practical classes. Students perform experimental protocols in the laboratory computer simulations about the pharmacological effect and mechanism of action and clínical aspects of various therapeutic groups studied in the theoretical part of the course
Practice 1. In vitro assays for antitumoral drugs : MTT
Practice 2. Study of cardiovascular active drugs on blood pressure and heart rate in anesthetized rats. Virtual simulation
Practice 3-4. Introduction to clinical trial, therapeutic guidelines and clinical cases.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	4,00
Theory	65,00
Seminar	6,00
Laboratory	15,00
Total hours	**90,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	12,00
Independent study and work	114,00
Preparation of lessons	0,00
Preparation for assessment activities	6,00
Resolution of case studies	3,00
Total hours	**135,00**

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.

Seminars.- In the seminars, students will be also proposed in order to allow the studient to relate and integrate concepts taught in the various subjects. In these seminars students will participate in complementary activities (debates, analysis of readings, press news,...) covering current issues related to the subject.

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 II. 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 corresponding practice has been completed, the students will analyze the results and resolve some issues raised by the teacher at the beginning of the session or during the development of the practical lesson. All activities will be evaluated.

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.

It should be noted that the focus of the theoretical classes, practices, seminars and tutorials, as well as the competencies to be achieved, integrates the Sustainable Development Goals (SDG) promoted by the United Nations. Among others, it is worthy highlighting the Rational Use of Medicine and the promotion of Community Health (Good Health: Objective 3) and Quality Education (Objective 4). In addition, aspects related to SDG 5 (gender equality) and 10 (reduction of inequalities) are also worked on throughout the subject, addressing the differences in the response to drugs according to gender and access to medicines of the entire population.

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.

- **75% of the grade**: will come from the score of the theoretical exam. Student who pass the first part of the course in January only will be examined of the second part in June, and the final score will be the average between the two parts (the score of both parts must be > 5) . The mark of the first part will be saved to the second call (July).
- **10% of the grade**: will come from the score obtained for practical lessons, which will be compulsory. The score will take into account the work done throughout the sessions and the evaluation tests.
- . Practical lessons are mandatory and in case a student fails the subject the year that they were taken, the score obtained will be applicable to only the consecutive year.
- **10% of the grade:** will come from the evaluation of the work done and presented in seminars (5%) as well the participatory attendance to all activities, includding tutorials (5%). The ability to collaborate with the rest of the group will be considered**.**
- **5% of the grade:** will correspond to the continuous assessment exercises carried out throughout the course.
- **It is an essential requirement** to pass the subject to have taken and passed the **practical lessons** and the **theoretical exam.**

It is important to remember that these PRACTICES are MANDATORY and therefore CANNOT BE REPAIRED, in accordance with Article 6.5 of the UV Assessment and Grading Regulations for Bachelor's and Master's degrees. If, for a justified reason, you cannot attend, you must notify us with sufficient notice. This way, the subject leader can assign you a session in another group.

According to the guidelines of the CAT of Pharmacy (May 14, 2012), students who do not show the theory exam but have participated and note any / s of the teaching activities carried out (seminars, laboratory, computer room, tutorial , etc..) will be assessed as not shown in the first round, but still not submitted for consideration by theory, the final grade on the second call will take into account the marks obtained in the various activities and thus may appear as SUSPENSE .

Evidence of copying or plagiarism in any of the assessable tasks will result in failure to pass the subject and in appropriate disciplinary action being taken. Please note that, in accordance with article 13. d) of the Statute of the University Student (RD 1791/2010, of 30 December), it is the duty of students to refrain from using or participating in dishonest means in assessment tests, assignments or university official documents.

In the event of fraudulent practices, the **Action Protocol for fraudulent practices at the University of Valencia** will be applied (ACGUV 123/2020):https://www.uv.es/sgeneral/Protocols/C83sp.pdf

REFERENCES

- Fernández Alonso S, Ruiz Gallo M. Fundamentos de Farmacología básica y clínica 3ª ed., Editorial Médica Panamericana 2024
- Golan DE, Tashijan AH, Armstrong EJ, Armstrong AW. Principios de Farmacología: Bases fisiopatológicas del tratamiento farmacológico. 4ª ed., Wolters Kluver 2017
- Goodman & Gilman- Las bases Farmacológicas de la Terapéutica. 14ª ed., Mc Graw-Hill Interamericana 2023
- Howland R.D. Lippincotts Illustrated Reviews: Pharmacology. 8th ed., Lippincott Williams &Wilkins 2022
- Agencia Española de Medicamentos y Productos Sanitarios: http://aemps.es/
- European Medicines Agency: www.ema.europa.eu/
- International Vademecum: www.vademecum.es/
- Catálogo de especialidades farmacéuticas. Consejo General de Colegios Oficiales de Farmacéuticos (Blot plus 2.0) 2013: http://www.portalfarma.com/
- e-libros disponibles a través del Servicio de Biblioteca y Documentación de la Universidad de Valencia: http://trobes.uv.es/
- Katzung B.G, Vanderah TW. Farmacología básica y clínica. 15ª ed. McGraw, 2020
- Lorenzo P y cols. Velázquez-Farmacología Básica y Clínica. 20ª ed., Editorial Médica Panamericana 2025
- Ritter JM, Rang HP, Dale MM. Farmacología. 10ª ed., Elsevier, 2024
- Stevens, C. W. Brenner y Stevens. Farmacología básica. 6ª ed., Elsevier, 2023
- Flórez Beledo J, Avendaño C, Mediavilla Martínez A, Farmacología humana. 7ºed., Elsevier, 2025
- Brenner y Stevens, farmacología Básica. 6ªed., Elsevier, 2023