1. OVERVIEW

Subject Area	Applied Pharmacology
Degree	Bachelor's Degree in Human Nutrition and Dietetics
School/Faculty	Biomedical and Health Sciences
Year	Second
ECTS	3
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On campus
Semester	Semester 4
Coordinating professor	Ainhoa Pérez Garijo

2. INTRODUCTION

Applied Pharmacology is a compulsory subject area worth 3 ECTS credits, delivered over one semester in the second year of the Bachelor's Degree in Nutrition. This subject area is part of Module 4: Nutrition, Dietetics and Health Sciences, which is worth a total of 36 ECTS credits.

Pharmacology is relevant to nutrition, as treatments that use drugs may affect patients' nutritional status. Likewise, nutrients and food may affect the therapeutic efficacy and safety of drugs. Any dietician/nutritionist must have basic knowledge of pharmacology, as this will allow them to:

- Assess nutritional status, taking a complete view when considering a patient's pharmacological treatments.
- Identify drugs that may alter a patient's nutritional status.
- Identify medicines that may interact with food and produce adverse reactions or nutritional deficiencies.
- Identify medicines taken by patients for certain medical conditions related to nutrition.

This subject area covers the basic concepts of pharmacokinetics, pharmacodynamics and adverse reactions in order to understand the processes and factors that affect drugs and their mechanisms of action in the body. Students will also be introduced to the drug groups most related to conditions that require intervention from a nutritionist or that may alter the nutritional status of a patient.

3. SKILLS AND LEARNING OUTCOMES

Key skills (CB, by the acronym in Spanish):

- CB2: Students can apply their knowledge to their work professionally and possess the necessary skills, usually demonstrated by forming and defending opinions, as well as resolving problems within their study area.
- CB3: Students have the ability to gather and interpret relevant data (usually within their study area) to form opinions which include reflecting on relevant social, scientific or ethical matters.
- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
- CB5: Students have developed the learning skills necessary to undertake further study in a much more independent manner.

General skills (CG, by the acronym in Spanish):

- CG13: Understand and assess the relationship between food and nutrition in situations of health and situations of illness.
- CG14: Apply scientific knowledge of physiology, pathophysiology, nutrition and food to dietary planning and advice for individuals and groups of all ages, including both healthy and unwell people.
- CG15: Design and implement protocols for assessing nutritional status, identifying nutritional risk factors.
- CG16: Interpret a nutritional diagnosis, assess the nutritional aspects of a patient's medical record and implement a diet plan.
- CG17: Be familiar with the structure of food services and hospital food/nutrition units, identifying and carrying out the functions of a dietician/nutritionist as part of a multidisciplinary team.
- CG18: Participate in the organisation, management and implementation of different methods of feeding patients and providing nutritional support in hospitals, as well as of outpatient dietary/nutritional treatment.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT6: Problem solving: ability to solve an unclear or complex issue or situation which has no established solution and requires skill to reach a conclusion.
- CT7: Decision making: ability to choose between different options or methods to effectively solve different problems or situations.
- CT9: Ability to put knowledge into practice, using the skills acquired in the classroom to mock situations based on real life experiences that occur in the relevant profession.

Specific skills (CE, by the acronym in Spanish):

- CE95: Know the basics of Pharmacology. Pharmacokinetics and Pharmacodynamics.
- CE96: Be familiar with the main interactions between drugs and food, drugs and enteral nutrition, and the factors that affect nutritional and metabolic status.

- CE97: Know how to find and use the bibliographic and computer resources available for looking up information about pharmacology.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Learn about clinical pharmacology applied to nutrition.
- RA2: Interaction between drugs and nutrients.
- RA3: Know the sources of information available for finding pharmacological information.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB2, CB4, CB5, CG13, CG14, CG16, CG18, CT6, CT7, CT9, CE95	RA1: examine the clinical pharmacology applied to nutrition to identify the drugs that a patient may be taking during the nutritional consultation.
CB2, CB4, CB5, CG13, CG14, CG16, CG18, CT6, CT7, CT9, CE96	RA2: identify and predict drug-nutrient interactions that may occur in a patient under pharmacological treatment in order to minimise nutritional and pharmacological risk.
CB2, CB3, CB4, CB5, CG18, CT9, CE97	RA3: use available sources of pharmacological information to broaden knowledge, make more informed decisions and give better advice regarding nutrition

4. CONTENTS

The subject area is divided into three learning units, which are then divided into topics (two or three topics depending on the unit):

LEARNING UNIT 1: GENERAL CONCEPTS OF PHARMACOLOGY

- Topic 1: Basic concepts of the mechanisms of drug action: pharmacokinetics and pharmacodynamics
- Topic 2: Adverse reactions: definition, classification and identification
- Topic 3: Drug interactions: food-drug interactions, drug-food interactions

LEARNING UNIT 2: PHARMACOLOGY APPLIED TO NUTRITION (1)

- Topic 4: Gastrointestinal drugs: Vomiting, diarrhoea, constipation, ulcers, reflux (gastric secretions)
- Topic 5: Drugs for metabolic disorders: Diabetes mellitus, dyslipidaemia, hyperuricaemia, gout, calcium metabolism, thyroid hormones

LEARNING UNIT 3: PHARMACOLOGY APPLIED TO NUTRITION (2)

- Topic 6: Drugs for cardiovascular disease: high blood pressure, heart failure, anticoagulants and antiplatelet drugs

- Topic 7: Drugs for obesity and eating disorders: weight loss

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture
- Collaborative learning
- Case studies
- Problem-based and project-based learning
- Learning based on workshops/labs

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
Lecture	25
Independent working	13
Case studies	5
Group activities	5
Written reports and strategies	5
Workshops and/or lab work	9
Tutorials	9
Knowledge tests	2
TOTAL	75 h

Blended learning

Type of learning activity	Number of hours
Reading of content	6
Online seminars	7
Independent working	25
Case studies	6
Group activities	5

Written reports and strategies	5
Workshops and/or lab work	9
Online tutorials	9
Knowledge test	3
TOTAL	**75**

7. ASSESSMENT

The assessment methods, together with their respective weighting towards the final grade for the subject, are as follows:

On campus:

Assessment method	Weighting
Submission of reports and essays	10%
Participation in debates	10%
Laboratory work	20%
Performance observation	10%
Knowledge test	50%

Blended:

Assessment method	Weighting
Submission of reports and essays	10%
Participation in debates	10%
Laboratory work	20%
Performance observation	10%
Knowledge test	50%

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities, including the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

Core bibliography:

- Mestres C y Durán M. Farmacología en Nutrición. 1ª ed. Ed Médica Panamericana. Madrid. 2011
- Velázquez.re Manual de Farmacología básica y clínica. 1ª ed. Ed. Médica Panamericana. Madrid. 2012
- Rang HP y Dale MM. Farmacología. 8ª ed. Ed. Elsevier, Churchill Livingstone. Barcelona. 2015.
- Flórez J. Farmacología Humana. 6ª ed. Ed. Elsevier. 2013

Recommended/additional bibliography:

- Montoro JB. y Salgado A. Interacciones fármacos-alimentos. Ed. Rubes, 1ª ed. Novartis. 1999.
- Calvo Hernández V y Planas Vilá M. Interrelación entre fármacos y nutrientes fisiopatológicas determinadas. Ed. Glosa. 2008
- Ruiz-Gayo M y Fernández-Alfonso MS. Fundamentos de Farmacología Básica y Clínica. 2ªed. Ed. Médica Panamericana. Madrid. 2013

Medicine databases.

- Consejo General de Colegios Farmacéuticos (BOT): https://botplusweb.portalfarma.com/
- Agencia Española del Medicamento: http://www.agemed.es
- Sociedad Española de Farmacia Hospitalaria: http://www.sefh.es
- Food and Drug Administration: http://www.fda.gov/
- Guías Clínicas en Atención Primaria: http://www.fisterrra.com
- Lexicom
- Información Terapéutica del Sistema Nacional de Salud: http://www.msps.es/biblioPublic/publicaciones/recursos_propios/infMedic/home.htm