COURSE DATA

DATA SUBJECT

Code: 47010
Name: Pharmacology and Nutrition
Cycle: Master's Degree
ECTS Credits: 3
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
2280 - Master's Degree in Advanced Optometry and Vision Sciences	Facultat de Física	1	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2280 - Master's Degree in Advanced Optometry and Vision Sciences	Materias Optativas	ELECTIVES

COORDINATION

ALBARRAN DIEGO CESAR ANTONIO

SUMMARY

This course provides an overview of the most commonly used drugs and nutritional supplements in ophthalmology, with a special focus on their practical application for optometrists. It covers the main pharmacological groups used in the treatment of ocular diseases, their mechanisms of action, relevant side effects, and key considerations when referring to a specialist. The course also reviews the basic principles of ocular nutrition, antioxidant supplementation, and the scientific evidence supporting their use in conditions such as AMD, dry eye, and glaucoma. The course has a clinical and practical orientation, equipping the optometrist to recognize drug interactions, provide appropriate patient guidance, and collaborate effectively with ophthalmologists.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

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

OTHER REQUIREMENTS

It is recommended to have prior knowledge of ocular physiology, visual system anatomy, and the fundamentals of general pathology.

COMPETENCES / LEARNING OUTCOMES

2280 - Master's Degree in Advanced Optometry and Vision Sciences

Act autonomously in learning, make informed decisions in different contexts, issue judgements based on experimentation and analysis and transfer knowledge to new situations.

Apply the knowledge acquired and be able to solve proplems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to the field of study.

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

Collaborate effectively in work teams, taking on 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, considering the Sustainable Development Goals as a reference.

Correlate malnutrition-related alterations associated with obesity, hypertension, diabetes and vitamin deficiencies, among others, with eye health and vision.

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

Have ethical commitment and social responsibility, both in the care component linked to the optometrist profession and in clinical research.

Identify dietary and nutritional factors that may affect eye health and the progression of chronic eye diseases.

Identify the effects of drugs on visual function.

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

Know how to communicate conclusions and the knowledge and rationale behind them to both specialised and non-specialised audiences clearly and unambiguously.

Plan and manage time and resources, and gain experience in decision-making.

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 visual and ocular effects of medication use.

Select the most appropriate ocular and visual clinical assessments related to the use of medication.

Understand the effectiveness, progression and discharge in pharmacological treatments.

Understand the physicochemical properties of ocular drugs and their effects on ocular pathologies including knowledge of possible adverse pharmacological reactions.

Understand the protein and vitamin components of food, nutrients and nutraceuticals and their impact on eye health and patients quality of life.

Understand the therapeutic or diagnostic aim of drugs and their adverse effects.

Work in multidisciplinary teams in the health sciences.

DESCRIPTION OF CONTENTS

Topic 1. Health and Nutrition
This topic introduces the fundamentals of ocular health from a nutritional and preventive perspective. It addresses the main nutrients and micronutrients that influence the metabolism and protection of ocular tissues, with a special emphasis on their role in prevalent conditions such as macular degeneration, dry eye, or cataracts. The available scientific evidence (such as the AREDS and AREDS2 studies) regarding the use of nutritional supplements will be reviewed, as well as general dietary recommendations that may contribute to maintaining good visual function. The role of the optometrist in promoting healthy habits and guiding patients in the rational use of supplements will also be discussed.

Topic 2. Diagnostic Drugs in Eye Care: Anesthetics, Mydriatics, Cycloplegics, and Miotics
Study of the drugs used in optometric examinations. Their mechanisms of action, clinical indications, duration of effect, and precautions associated with their use are reviewed, both in the general population and in patients with risk factors.

Topic 3. Antimicrobials and Infectious Eye Diseases
Review of the most common ocular infections (bacterial conjunctivitis, keratitis, blepharitis, etc.) and the associated antimicrobial treatments. The different groups of topical antibiotics and antivirals are analyzed, along with their spectrum of activity, administration guidelines, and risks of resistance.

Topic 4. Inflammatory and Allergic Eye Disease: Steroids, NSAIDs, Antiallergics, and Lubricants
This topic focuses on the pharmacological groups used to treat ocular inflammation and allergy. Mechanisms of action, types of drugs, available formulations, and their main side effects will be explained. The goal is to understand the most common treatments in order to identify the active ingredients a patient may be using, provide guidance on proper administration, and detect relevant adverse effects. The complementary role of lubricants in these conditions and the importance of follow-up will also be addressed.

Topic 5. Antiglaucoma Medications
Analysis of the main groups of drugs used to treat glaucoma: beta-blockers, prostaglandin analogues, carbonic anhydrase inhibitors, among others. Their mechanisms of action, therapeutic combinations, and systemic and ocular side effects are discussed.

Topic 6. Ocular Therapeutic Effects of Nutraceuticals, Drug Toxicity, and Adverse Effects
Exploration of the most commonly used nutritional supplements (nutraceuticals) in the visual field, their scientific basis, and potential benefits in conditions such as AMD or dry eye. Adverse ocular effects of systemic drugs and toxicity associated with misuse or overuse of medications or supplements are also studied.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	22,00
Seminar	8,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	25,00
Preparation of lessons	0,00
Preparation for assessment activities	5,00
Resolution of case studies	0,00
Total hours	**45,00**

TEACHING METHODOLOGY

The course combines lectures and seminars aimed at promoting both knowledge acquisition and active student participation.

Lectures:
The expository method (lecture-based teaching) is used, supported by audiovisual materials (images, videos, and diagrams) to facilitate the understanding of concepts and techniques.

Seminars:
Quizzes and problem-solving exercises based on the course content are proposed, encouraging discussion and the practical application of the procedures studied.

EVALUATION

The assessment system combines individual tests and group work, with the following components and weightings:

Theoretical or theoretical-practical exam:
On-site assessment through written tests, which may include multiple-choice questions, essay questions, or clinical cases focused on the use of drugs and supplements. It accounts for 80% of the final grade.

Assessment of group or individual work:
Completion of reports, presentations, or literature reviews on topics such as drug interactions, supplementation protocols, or nutritional counseling guidelines. This component accounts for 20% of the final grade.

This grading system applies only to students sitting the first exam session. The second session will be assessed through a single theoretical exam, which will account for 100% of the final grade, with no consideration of continuous assessment.

REFERENCES

Basic references:

- Jimmy D. Bartlett, Siret D. Jaanus. *Clinical Ocular Pharmacology.* Butterworth-Heinemann (Elsevier Health Sciences), 2007. ISBN 978-0750675765.
- Myron Yanoff, Jay S. Duker. *Oftalmología.* Elsevier España, S.L.U., 2019 (5.ª edición). Capítulo: Terapéutica ocular. ISBN 978-84-9113-554-8.
- Jack J. Kanski, Brad Bowling. *Oftalmología Clínica: Una aproximación sistemática.* Elsevier España, S.L.U., 2016 (8.ª edición). Capítulo: Fármacos y tratamiento. ISBN 978-84-9113-003-1.

Complementary references:

- Neil J. Friedman, Peter K. Kaiser, William B. Trattler. *The Massachusetts Eye and Ear Infirmary Illustrated Manual of Ophthalmology.* Elsevier, 2020 (5.ª edición). ISBN 978-

0323613323.

- Lawrenson J.G., Evans J.R. *Antioxidant vitamin and mineral supplements for preventing age-related macular degeneration.* Cochrane Database of Systematic Reviews, 2023; 1 (1): CD000253.

- García Sánchez J., et al. *Micronutrientes y enfermedades oculares.* Archivos de la Sociedad Española de Oftalmología, 2017; 92(5): 237-247.

- National Eye Institute, Age-Related Eye Disease Study Research Group. *AREDS & AREDS2 Reports.* Bethesda: National Institutes of Health. Disponible en: https://www.nei.nih.gov/research/clinical-trials/age-related-eye-disease-study-areds