# OPTICS AND OPTOMETRY

# FACULTY OF SCIENCE

# UNIVERSITY OF ZARAGOZA

# FACULTY OF SCIENCE

The Faculty of Science is located at the heart of Zaragoza city, in San Francisco Campus. It has a long history of excellence in teaching and research. The Faculty has a strong international profile and attracts students from Europe and around the world. With more than 1,000 ISI journal articles published per year, the Faculty is a leading research hub at the University of Zaragoza, ranked among the top 200 world-class universities for Natural Sciences & Mathematics (ARWU 2016).

**Figures for the Faculty of Science:**

- 1850 students
- 450 professors + 100 researchers + 100 support staff
- 40 classrooms + 20 teaching labs + 150 research labs + 9 computer classrooms

**Undergraduate Degree Programs**

- BSc in Biotechnology
- BSc in Chemistry
- BSc in Geology
- BSc in Mathematics
- BSc in Optics and Optometrics
- BSc in Physics

**MSc Degree Programs**

- MSc in Geology: Techniques and applications
- MSc in Industrial Chemistry
- MSc in Mathematical modelling and research, Statistics and Computation
- MSc in Molecular and Cellular Biology
- MSc in Quantitative Biotechnology (***in English***)
- Msc in Molecular Chemistry and Homogeneous Catalysis
- MSc in Physics and Physical technologies
- MSc in Nanostructured Materials and Nanotechnological Applications (***in English***)
- MSc Erasmus Mundus in Membranes Engineering (***in English***)

**High level research: More than 1.000 research papers in JCR per year**

The Faculty has been the seed of Research Institutes of the University of Zaragoza:

- BIFI: Institute of Biocomputation and Physics of Complex Systems
- ICMA: Aragon Materials Science Institute
- INA: Institute of Nanoscience of Aragon
- ISQCH: Institute of Chemical Synthesis and Homogeneous Catalysis

- IUCA: Environmental Science Institute of Aragon
- IUMA: Institute of Mathematics and Applications

Most professors/researchers in the Faculty of Science are members of these institutes.

# BSc IN OPTICS AND OPTOMETRICS

**Duration:** 4 years full time. 60 ECTS per year.

**Language:** Spanish.

## Program aims:

The objectives of the degree that qualifies for the practice of the Optician-Optometrist profession are explicitly defined in the governmental order CIN/727/2009, from March 18th, establishing as functions for optical-optometrists the activities aimed at: detection of defects in ocular refraction, by means of its instrumental measurement; the use of visual re-education, prevention and hygiene techniques; and the adaptation, verification and control of optical aids.

Moreover, the high demand for surgical procedures for vision improvement, either cataract surgery or refractive surgery techniques, has meant an important change regarding professional activities in the vision field. In this way, the raising practice of these surgical procedures is creating the need for the ophthalmologist-surgeon activities to be complemented with other optical optometrists professionals specialized in pre- and post-surgical exams execution.

It is also necessary to mention the role of optical-optometrists in those technological fields related to the design of optical systems for visual enhancements and optometric measurement instrumentation.

In summary, this degree qualifies to practice the optical-optometrist profession, making alumni able to work in dispensing optics sanitary establishments, medical centers, primary care centers and public hospitals, ophthalmology centers and offices and companies in the optical sector.

## Structure:

**Year 1**. In the first year students must enrol in the following modules:

| Module | ECTS | Semester |
|---|---|---|
| 26800 - Anatomy and Histology | 9 | YL |
| 26801 - Physics | 9 | YL |
| 26803 - Mathematics | 9 | YL |
| 26804 - Visual Optics I | 12 | YL |
| 26805 - Chemistry and Optical Materials | 9 | YL |
| 26802 - Ocular and Visual System Physiology | 6 | S1 |
| 26806 - Optical Technology I | 6 | S2 |

S1: Semester 1. Mid-September to mid-January
S2: Semester 2. Beginning-February to end-May
YL: Year-long. Mid-September to end-May

**Year 2**. In the second year students must enrol in the following modules:

| Module | ECTS | Semester |
|---|---|---|
| 26807 - Optical and Optometric Instruments | 12 | YL |
| 26808 - Optometry Laboratory | 12 | YL |
| 26809 - Optical Physics | 6 | S1 |
| 26810 - Visual Optics II | 6 | S1 |
| 26811 - Optometry I | 6 | S1 |
| 26812 - Biology | 7 | S2 |
| 26813 - Statistical Methods for Optics and Optometry | 6 | S2 |
| 26814 - Optometry II | 6 | S2 |

**Year 3**. In the third year students must enrol in the following modules:

| Module | ECTS | Semester |
|---|---|---|
| 26815 - Ocular Pathology and Pharmacology | 10 | YL |
| 26816 - Clinical Optometry | 10 | YL |
| 26817 - Contactology | 16 | YL |
| 26818 - Optical Technology II | 6 | S1 |
| 26819 - Visual Therapy and Rehabilitation | 6 | S2 |

In the first semester of this third year they must also select three modules from the list of optative modules below.

**Year 4**. In the fourth year students must enrol in the following modules:

| Module | ECTS | Semester |
|---|---|---|
| 26821 - Optometric Actions in Ophthalmic Surgery | 8 | YL |
| 26822 - Paediatric Ophthamology | 6 | YL |
| 26820 - Optical Technology III | 6 | S1 |
| 26823 - Low Vision | 6 | S2 |
| 26824 - External Optometry Practicum | 18 | YL |
| 26825 - Undergraduate Dissertation * | 10 | YL |

In this fourth year they must also select one module from the list of optional modules

| Module | ECTS | Semester |
|---|---|---|
| 26826 - Expansion of Geriatric Optometry | 6 | S1 |
| 26827 - Expansion of Ocular Pathology and Pharmacology | 6 | ** |
| 26829 - Management, Business Initiative and Marketing | 6 | S1 |
| 26832 - Materials for the Optical and Ophthalmic Industry | 6 | S1 |
| 26833 - Ocular Prevention and Ergonomics at Work and in Sports | 6 | S2 |
| 26834 - Radiometry, Photometry, Colour and Photography | 6 | S1 |
| 26828 - Audiometry and Auditory Prostheses | 6 | S2 |
| 26831 - Sanitary and Deontology Legislation | 6 | ** |
| 26830 - Graphical Tools and Optical Design | 6 | S2 |

Not all the optional modules are available every year. A list of the available modules for the following year (starting in September) is published in June. The modules with ** in the Semester column are not being offered in 2018/2019.

## *Undergraduate Dissertation

Undergraduate Dissertation (UD) is a 250 hours project on any of the subjects of the Degree. It is undertaken during the 4$^{th}$ year. Students are supervised by a professor who defines the objectives of the Project and guides them along the work. The students must write a report and make a public defense of it.

# RESEARCH GROUPS IN OPTOMETRY

**1.- *PREVENTION OF BLINDNESS***

**Group leader**: Luis Pablo Júlvez

**Number of researchers**: (25)

**Research lines:**

- Bioavailability and penetration and neuroregenerative and neuroprotective drugs.

- Development of new tools for the diagnosis and monitoring of glaucomatous optic neuropathy

- Structural and functional evaluation of the nerve fiber layer of the retina as a marker of axonal damage in patients with neurodegenerative diseases?

- Study of embryonic and fetal neurodevelopment through the optic nerve

- Alternatives to medical and surgical treatment of optic neuropathy with glaucomatous origin and other eye diseases.

**Web:** http://www.iisaragon.es/giis029/

**2.- *VISUAL OPTICS***

**Group leader:** Rafael Navarro Belsué

**Number of researchers:** (8)

**Research lines:** The study of the human visual system, its functionality and efficiency in the processes of collection, representation and analysis of visual information. The central research line is the study of the optical system of the eye, but also the related factors: external, particularly visual aids (corrective lenses and ophthalmic optics in general) and lighting, as both have a direct influence on the optical quality of the vision response. To these factors we must add those of the visual system itself, particularly the influence of early neuronal processing of information leading to the visual feedback (visual acuity, contrast sensitivity, etc.).

**3.- *RESEARCH ON THE RETINA***

**Group leader:** Isabel Pinilla Lozano

**Number of researchers:** (18)

**Research lines:**

- Cell therapy of retinal degenerations with precursor cells of the Human Retinal Pigment Epithelium

- Study using OCT of the spectral domain of healthy and pathological retina and assessment of changes detected after treatment.

- Study of macular diseases in general and of those related to aging in particular.

- Treatment of macular edema secondary to diabetic maculopathy and retinal venous blockages

**Web:** http://www.iisaragon.es/giis048/