Cutting Edge Technologies in Vision Sciences

- Joint Postgraduate Program
- University of Crete & Foundation for Research and Technology (FORTH)

- An innovative and interdisciplinary MSc program designed to integrate fundamental science with translational research in the field of vision and optical technologies.

Participating Institutions

- University of Crete
  - School of Medicine
  - Department of Materials Science and Engineering
  - Department of Mathematics and Applied Mathematics
- Foundation for Research and Technology Hellas (FORTH)

These institutions combine expertise in clinical practice, material science, applied mathematics, and research excellence.

Past experience

- The program's success will be significantly bolstered by the collaborating Departments’ extensive experience from the highly successful "Optics and Vision" postgraduate program of the last decade, which will directly influence the current program's expanded interdisciplinary focus and design.

Program Overview

A modern, interdisciplinary MSc program focused on advanced research and applications in vision science and related technologies.

The program fosters cross-disciplinary learning and promotes synergy between biomedical engineering, informatics, and medical sciences.

Mission & Objectives

- Promote excellence in research and education
- Train scientists in advanced optical and biomedical technologies
- Connect academic knowledge with clinical applications
- Prepare graduates to contribute to innovation and scientific development in health-related sectors.

Why Choose This Program?

Interdisciplinary curriculum

Collaboration with leading research centers

Strong emphasis on innovation and technology transfer

International orientation and access to cutting-edge laboratories and facilities.

Target Audience

Graduates in Medicine, Biology, Physics, Material Sciences, Engineering, Informatics and related fields interested in vision science and technology.

Candidates aiming to deepen their knowledge and engage in applied research or clinical innovation.

Program Structure

- 4 Semesters (3 courses, 1 thesis), mainly with physical presence
- Taught courses, laboratory work, seminars, and Master's thesis
- English-taught program

- Includes 1 semester with interdisciplinary modules to tailor academic and professional interests.

Program Overview - Semesters 1 & 2

- **Semester 1: Foundational Knowledge (30 ECTS)**
- **Eye and Vision I (7 EC):** Basic anatomy & physiology of the eye and vision for diverse backgrounds.
- **Mathematics I (7 EC):** Functions, linear algebra, calculus fundamentals.
- **Waves and Tissues (7 EC):** Wave physics, interaction with tissues, vision science applications.
- **Biology (7 EC):** Cell biology, multicellular organism functions, neural tissue biology.
- **Mini Review Projects (2 EC):** Literature review, research evaluation, presentation skills.

- **Semester 2: Deeper Dive & Core Principles (24 ECTS)**
- **Eye and Vision II (6 EC):** Continuation with nosology, diagnostics, and therapeutics of eye problems.
- **Biostatistics (6 EC):** Principles of medical biostatistics and data management.
- **Principles of Imaging (6 EC):** Physics and math of imaging techniques, vision science applications.
- **Mathematics II (6 EC):** Differential equations and multivariable functions.
- **Visual Optics (6 EC):** Eye as an optical system, visual information processing.

Program Overview - Semesters 3 & 4

- **Semester 3: Specialization & Research**
- **Transdisciplinary Modules: Specialization Tracks (30 ECTS)**
- Students choose 4 modules from 5 specialized areas:
  - **Visual Pathway Signal Tracking:** Neurophysiology of vision.
  - **Refractive Errors Correction:** Modifying eye's optical properties.
  - **Slow Release Ophthalmic Drugs:** Ophthalmic pharmacology and drug delivery.
  - **New Ophthalmic Oncology Technologies:** Radiophysics in eye cancer.
  - **New Ophthalmic Imaging Technologies:** Modern imaging in ophthalmology.
- Modules involve collaborations with Medical School, ITE, and TEMY.

- **Semester 4: Master's Thesis: Capstone Research Project (30 ECTS)**
- Conducted in the 4th semester under faculty supervision.
- Focuses on completing a small research project, data collection, and comprehensive presentation.

Career Prospects for Graduates:

Doctoral-level postgraduate studies.

Successful careers in research institutions and the production sector.

Advancing modern research in the rapidly evolving field of Vision Sciences Technologies.

Teaching in high-level seminars related to the program's subject area.

Staffing Ophthalmic Clinics and Offices in the Public and Private sectors.

Staffing Laboratories and Companies active in the field of Vision technology.

Employment in similar positions requiring a high level of knowledge and skills in the program's subject area

Teaching Staff Overview

- **Faculty Members (Collaborating Departments od UoC)**
- **Collaborating Faculty Members (University of Crete):**
  - From other Departments/Schools of the University of Crete
- **External Collaborators:**
  - Research staff from the Institute of Electronic Structure & Laser (IESL) of the Foundation for Research & Technology – Hellas (FORTH).
  - Research staff from other Research Centers in Greece or abroad.
  - Scientists recognized in their field, holding a doctoral degree and relevant scientific work/publications.
- **Key Characteristics of the Teaching Staff**
- **Diverse and Multidisciplinary:** The staff brings together expertise from various scientific fields relevant to vision sciences and technology.
- **Strong Research Background:** Many members are highly cited, indicating significant contributions to their respective fields.
- **International Collaboration:** Several faculty members are involved in international research projects and networks.

Research Performance and Impact of Teaching Staff

- **Quantitative Research Metrics (based on data from 2021-2023)**

- **Publications:** An average of 140.25 publications per faculty member, with a total of 1,683 publications within the 2021-2023 period for the 12 core faculty members.
- **Citations:** An average of 3,744.58 citations per faculty member, totaling 44,935 citations for the 12 core faculty members.
- **h-index:** An average h-index of 30.08 per faculty member, with a cumulative h-index of 361 for the 12 core faculty members.

- **High-Impact Researchers**
- Several faculty members exhibit exceptional research performance, with some individual h-indices reaching as high as 65 and over 17,000 citations.
- This strong research output underscores the program's commitment to cutting-edge research and the quality of mentorship provided to students

Quality Policy & Objectives

- **Program Quality Commitment**
- The "Cutting-Edge Technologies in Vision Sciences" program's quality policy aligns with the University of Crete's, focusing on continuous improvement across all academic, research, and administrative aspects.
- It is publicly disseminated to ensure accountability and effective implementation by staff and students.
- The program is committed to enhancing its academic profile and curriculum objectives through continuous improvement
- The policy guarantees appropriate program structure and organization, effective teaching, qualified teaching staff, and efficient financial resource utilization.

Key Quality Assurance Areas & Strategic Goals

- **Strategic Objectives:**
  - **Student Support & Evaluation:** Aim for 70% completed course evaluations and 12 faculty as academic advisors by 2026.
  - **Research Excellence:** Target 30% of theses published in international journals and 10% of graduates pursuing doctoral studies by 2026.
  - **Internationalization:** Strive for 10% international student enrollment and 10% of courses with international faculty by 2026.
  - **Inclusivity & Accessibility:** Maintain 50% female enrollment and graduation rates, and ensure 100% AMEA-accessible classrooms and labs by 2026

Thank You!

For more information, visit:

https://mscs.uoc.gr/cetvis/