UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

From polymeric materials to augmented reality and health monitoring: the future of contact lens materials

2526-116R-M02

Title

From polymeric materials to augmented reality and health monitoring: the future of contact lens materials

Teacher(s)

- Module A: Polymers in contactology: why, and how, Dr. Mauri Michele (0.5 CFU)
- Module B: The evolution of contact lenses from fundamental requirements to the latest advances, Dr. Ponzini Erika (0.5 CFU)

Language

English

Short description

This doctoral course provides an interdisciplinary framework, blending materials science, biomedical engineering, and digital technology to investigate the field of prosthetic and functional materials. Using contactology as an example, the concepts explored are transferable to an array of advanced material applications. Contact lenses (CLs) have challenging requirements, such as high oxygen permeability, wettability, and outstanding mechanical

properties. The course presents the strategies used to address them, such as tailored polymerization, molecular network engineering, controlled micro- and nanophase separation. Surface engineering techniques, including plasma treatments, and polymer chain grafting, will be discussed to optimize the interaction with biological surfaces. The focus then shifts to the latest advancements in smart CLs, covering the technologies behind glucose-sensing CLs for diabetes and intraocular pressure-sensing CLs for glaucoma. Additionally, it covers the design of smart CLs capable of overlaying digital information onto the physical world (augmented reality), emphasizing potential applications in healthcare, navigation, and entertainment.

CFU / Hours

1 CFU

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Teaching period

20-24 April 2026

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | INDUSTRY, INNOVATION AND INFRASTRUCTURE