



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Visual Ergonomics

2425-1-F1702Q003

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#### Aims

To develop a student's theoretical understanding of visual ergonomics and the impact of the working environment on the visual system and working performance. Provide elements on how to assess the characteristics of working stations and how to measure the responses of the visual system. To allow students to provide optical appliances and other optometric interventions to deal with the visual loads and visual fatigue in the working environment.

#### Learning Objectives

By the end of the module, a successful student will gain:

- LO1: theoretical knowledge about Visual Ergonomics, Radiometry, Photometry, and Digital screen technology and the ability to perform photometric measurements.
- LO2: practical skills to perform digital simulation of lighting in working environments
- LO3: practical skills to perform radiometry/photometry measurements in working environments
- LO4: theoretical knowledge about the impact of the working environment characteristics on the visual, the musculoskeletal and the postural systems, and the ability to perform measurements of these responses.
- LO5: theoretical knowledge and decision making on optometric interventions for visual ergonomics issues.

#### Contents

The module will cover principles of visual ergonomics: characterization of working environment, assessment of visual load, optometric management of visual ergonomics issues.

#### Detailed program

## Lectures

1. What is Visual Ergonomics.
2. International/national standard (ISO 9241-303:2011) Ergonomics of human-system interaction.
3. Radiometry vs. Photometry.
4. Photometric units: lighting, sources, illumination, luminance, retinal illuminance.
5. Digital screen technology:
  - characteristics of the screens and electronic displaying (Cathode ray tube displays, Liquid crystal displays)
  - anisotropic effects of LCD screens.
6. Glare/reflections and polarising optical devices.
7. Selective/protecting filters in specific work environments. Measuring the load of visual environment on the visual system and human body responses: subjective and objective assessments
8. The variety of environmental and occupational conditions
9. Types of visual responses to visual working load: the case of computer vision syndrome.
10. The use of contact lenses in specific work environment (air conditioning and contact lenses, cold/warm environments and contact lenses, dusty/dangerous work environments, humidity level and contact lenses, etc.)
11. Optometric interventions of visual ergonomics issues
12. Short outline of vision with smart devices (3D and visual augmented reality devices and smart glasses and contact lenses)

## Interactive Lectures

1. software for simulations of lighting and renderings of a workspace
2. Measuring photometric characteristics of visual stimuli
3. eye tracker methods for analysing eye movements.

## Prerequisites

See curricular prerequisites for the admission Master's Degree Program

## Teaching form

Learning objectives will be pursued through different teaching methods:

- ? Frontal Lectures (3CFU 21h)
- ? Interactive Lectures remotely delivered (synchronous) (3CFU 21h) (Ansys software for lighting)
- ? Tutoring
- ? Student-managed learning

## Textbook and teaching resource

Lecturers' handouts

## **Semester**

First semester

## **Assessment method**

Final summative assessment: Written (MCQs + 1 open question) and oral exam:

## **Office hours**

Appointment needed

## **Sustainable Development Goals**

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | RESPONSIBLE CONSUMPTION AND PRODUCTION

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