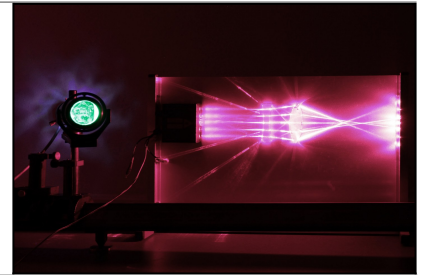


EF1 | Optics without calculation



NIVEAU : BASIC

Publics : Anyone wishing to use optical instruments or become familiar with optics

Prérequis : None

Responsable(s) pédagogique(s) : Gilles le Boudec - Expert consultant / Ingénieur R&D

Langue de la formation : French

Capacité maximum : 12

Prix : 1380€ HT - **Durée :** 3 days - 21 h

Objectifs

- ▶ Acquire quickly and simply the basics of optics
- ▶ Communicate effectively in the field of optics
- ▶ Understand a specification
- ▶ Make the best use of common optical instruments
- ▶ Design and set up a simple assembly

Thèmes abordés

Nature of light (wave / particle), light sources and optical spectrum

- ▶ Light propagation (free space, guided optics, optical fiber...)

Image formation by lenses and mirrors

Phenomena of interference, diffraction and polarization

Operation and use of optical instruments

- ▶ The eye and its defects
- ▶ Simple instruments (telescope, viewfinder, collimator...)

EF1 | Optics without calculation

Le programme

Nature of light, reflection phenomena and refraction

- ▶ Waves and particles (light rays)
- ▶ Diversity of light sources, UV spectrum, visible, IR, white light, laser
- ▶ Free and guided propagation (fiber optics)
- ▶ Plan mirror: paths of incident and reflected rays
- ▶ Refractive index of a transparent medium
- ▶ Path of light in a parallel-sided blade and in a prism (dispersion)

From the simple lens to the operation of an optical instrument

- ▶ Tracing of elementary rays in a lens
- ▶ Convergent, divergent lenses
- ▶ Position of an object and its image, magnification
- ▶ Eye, photo lens, magnifying glass, telescope, microscope

Wave phenomena

- ▶ Interferences: principle, summation of two vibratory waves
- ▶ Illustrations: thin blades (soap bubbles, oil films), optical treatments, filters
- ▶ Diffraction: origin of the phenomenon (wavelet sources)
- ▶ Illustrations: diffraction by a slot, grating, compact disc, hologram

Experimental demonstrations and practical work

- ▶ Light guidance
- ▶ Light rays propagation in a homogeneous, inhomogeneous medium
- ▶ The laws of reflection, refraction
- ▶ Continuous spectra, spectra of lines
- ▶ Imaging by an objective (real, virtual environments), by a spherical mirror
- ▶ Geometric and chromatic aberrations
- ▶ Near-field / far-field diffraction
- ▶ Interference (Michelson interferometer)

Méthodologie et évaluation

Courses and exercises

Interactive experimental demonstrations

Practical work on instruments