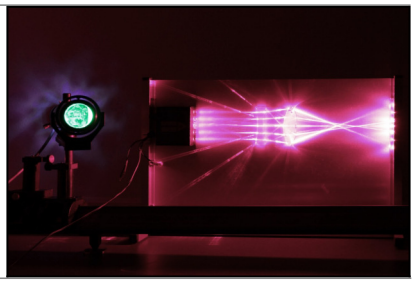
EF1 | Optics without calculation



NIVEAU : DÉBUTANT

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 : Français

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

Prochaines sessions

- 01 décembre 2020 au 03 décembre 2020 - Palaiseau

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

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