OPTIQUE ET PHOTONIQUE POUR L'INGÉNIEUR

OPTICAL METHODS

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| Lecturers : 14.0 | TC : 6.0 | PW : 4.0 | Autonomy : 4.0 | Study : 4.0 | Project : 0.0 | Language : MI

Objectives

The recent growth of optical methods in various fields is due to the inherent advantages of these methods (high spatial and temporal resolutions, punctual or global measure, contactless method ...) and recent advances in photonics. The applications cover a wide range of industrial and research fields: automotive, aerospace, health, environment ... This course aims to provide the knowledge required to the understanding of the most used optical technologies.

Keywords : Telemetry, Interferometry, Infrared technology, Optical materials processing

Programme

Introduction: major fields of optics
Spatio temporal coherence, metrology applications
Notions of photometry
Noise phenomena in detectors
Applications to measurement (principles): telemetry, velocimetry, interferometry
Applications of lasers in material processing
Tutorials: Holography, telemetry, interferometric sensor, Applications of lasers in material processing
4 lab works (1h each): holography, vibrometry, FTIR spectrometry, laser anemometry

Learning outcomes

- How to choose and implement the relevant optical formalism (ray optics, wave optics, electromagnetic, photometry ...)
- Being able to identify the components of an optical measurement system
- How to choose a method of measuring or optical processing
- Identify the kinds of noise in an optical detector

Independent study

Objectifs : In depth understanding of a particular optical technology

Méhodes : Problem based learning : brainstorming (2h) / preparation of presentations and restitution

Core texts

B.E. A . Saleh, M. C. Teich, *FUNDAMENTAL OF PHOTONICS*, Wiley, 2007
R. Farcy *APPLICATIONS DES LASERS*, Masson, 1993
D. Schuöcker*ENGINEERING LASERS AND THEIR APPLICATIONS, HANDBOOK OF THE EUROLASER ACADEMY, VOLUME 1 & 2*, Springer, 1998

Assessment

Final Mark = 60% Knowledge + 40% Know-how
Knowledge 60% = 100 % Final exam (written test)
Know-how 40% = 100% Final oral presentation