

Optics

Introducing

Description

Course Chapter Breakdown:

The course is divided into several key chapters to provide you with a comprehensive understanding of geometrical optics:

1- Introduction to Geometrical Optics

- °Definition and importance of geometrical optics.
- °Historical background and recent developments in the field.

2- Fundamental Laws of Geometrical Optics

- °Law of reflection.
- °Law of refraction (Snell's Law).
- °Fermat's Principle and its applications.

3- Propagation of Light in Homogeneous and Inhomogeneous Media

- °Study of the rectilinear propagation of light.
- °Analysis of homogeneous and inhomogeneous media.
- °Effects of variations in the refractive index.

4- Reflection and Refraction at Interfaces

- °Behavior of light rays at interfaces between different media.
- °Total internal reflection and its applications.
- °Study of prisms and lenses.

5- Simple Optical Systems

- °Plane and spherical mirrors.

- °Thin and thick lenses.
- °Image formation by simple optical systems.

6-Complex Optical Systems

- °Combination of lenses and mirrors.
- °Analysis of optical aberrations.
- °Design and optimization of complex optical systems.

7-Practical Applications of Geometrical Optics

- °Common optical instruments (microscopes, telescopes, cameras).
- °Applications in photonics and telecommunications.
- °Case studies and practical projects.

This course aims to provide you with a deep understanding of the fundamental concepts of geometrical optics and to develop your analytical and practical skills to solve complex problems in this field.

Objectives

Course Objectives:

By the end of this course, you will be able to:

- 1-Understand the fundamental principles of geometrical optics, including the laws of reflection and refraction.
- 2-Analyze the behavior of light rays through different media and interfaces.
- 3-Use mathematical tools to model and solve problems in geometrical optics.
- 4-Apply geometrical optics concepts to the design and analysis of simple and complex optical systems.
- 5-Interpret experimental and theoretical results to evaluate the performance of optical systems.

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse