Syrian Arab Republic

Higher Institute for Applied Sciences and Technology

Course Specification Document

Title	Geometrical and Physical Optics

Credits	2.5 ECTS

Aims	This course aims to provide the student with knowledge related to the principles of engineering light, Gaussian conditions and their application to the spherical refractor, optical interference, interference devices and some of their applications, and the method of finding the shape of diffraction resulting from a barrier. The course also aims to introducing the student to some applications of diffraction and enabling him to deal with thin lenses and interpret its phenomena, in order to support his future studies in physics and engineering sciences.

Intended learning outcomes

On successful completion of this course, the student will be able to:

- Understand the spherical breaker.
- Characterize thin lenses and their applications.
- Comprehend light interference.
- Comprehend diffraction.
- Handle a number of optical devices
- Find solutions to some problems in practical life.

Syllabus

- **Fermat's principle, perfect and approximate stigmatism:** The concept of the optical path, the calculation of the optical path in different cases, the text of Fermat's principle, applications, the definition of the perfect and approximate rasterization, examples of optical devices that have the perfect stigmatism, paraxial approximation..
- **Spherical refractors, Spherical mirrors:** Conjugation relations of a spherical refractor, burners, geometric construction of illusions, spherical mirrors.
- **Thin lenses and their applications:** Thin lenses approximation, the magnifying glass, the camera, the human eye, the telescope and the microscope.
- **Interferometry:** The conditions for the interference of light, spatial coherence and temporal coherence, interferometric devices.
- **Diffraction:** Huygens- Fresnel principle, Fraunhofer diffraction pattern, finding the distribution of light intensity resulting from diffraction in different cases.