



University of Pretoria Yearbook 2022

Geometrical optics 800 (GMO 800)

Qualification	Postgraduate
Faculty	Faculty of Natural and Agricultural Sciences
Module credits	36.00
NQF Level	09
Programmes	MMed (Ophthalmology)
Prerequisites	No prerequisites.
Contact time	1 lecture per week
Language of tuition	Module is presented in English
Department	Physics
Period of presentation	Year

Module content

Mathematical description of waves; Light as an electromagnetic wave; Nature of sources of light; Wave fronts (Huygens principle); Snell's Law; Index of refraction; Exploration of the laws of reflection and refraction at planar and curved surfaces; Ray tracing methodology to find position, Nature of images and magnification; Thin lens formula; Conjugate foci formula; Lensmaker's formula; Ophthalmic prisms: characteristics, classification and refractive power; Thin lenses: types, image formation; Cylindrical lenses: Introduction; Optical Systems: Lens combinations (notation, toric lenses); Thick lenses (cardinal points, system power); The Eye: structure and function, reduced eye; Aberrations in general; Eye defects: myopia, hyperopia, presbyopia, astigmatism; Optical apparatus for ophthalmology: invasive / non-invasive, ophthalmic laser, ophthalmoscope, fundus camera, light coagulator.

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