

Subject Matter : Geometrical and Physical Optics

Code/Credit : FIS 318/3

Prerequisite : Vibration and wave

Competences : After completing this course, student should have ability and be able to understand, analyze and to achieve concepts of geometrical and physical optics in daily activities.

Description : This course will give fundamental concepts about nature of light, geometrical optics (reflection, refraction, thin and cylindrical lens) and physical optics (interference, diffraction and polarization of light).

References:

Pedrotti, Frank L., Pedrotti, Leno M., and Pedrotti, Leno S. 2007. *Introduction to Optics 3rd edition*. Pearson Addison Willet: USA

Akira Hirose, 1985. *The Wave Phenimena*. John Willey and Sons.

Boas L May, 1983. *Mathematical Methods in The Physical Sciences*. New York : John Willey and Sons.

Jenkins/White, 1985. *Fundamental of Optics*. Tokyo : Mc Graw Hill Company

M. O. Chia 1996. *Gelombang* . Bandung : FMIPA ITB

Sahara Muslim 2002. *Gelombang dan Optik*. Yogyakarta DIKTI FMIPA UGM

Tofik M. 2004. *Gelombang dan Optik* : Bandung: FMIPA UPI JICA

Learning Activities

Day	Section	Part	Activities
1,2	Introduction	a. Nature of light b. Brief history of light c. Particles and photons d. The Electromagnetic spectrum	Discussion, assignments and test
3,4	Law of reflection	a. Law of reflection b. Snell's Law c. Huygen's principle d. Fermat's principle	Discussion, assignments and test
5	Reflection	a. Reflection in plane mirrors b. Reflection at a spherical surface	Discussion, assignments and test

6,7	Refraction	a. Refraction through plane surfaces b. Refraction at a spherical surface	Discussion, assignments and test
8	Midtest		
9	Thin Lenses	a. Introduction to thin lenses b. Newtonian equation for the thin lenses	Discussion, assignments and test
10	Cylindrical lenses	a. Concave cylindrical lenses b. Convex cylindrical lenses	Discussion, assignments and test
11,12	Interference of light	a. Two-beam interference b. Newtons' Rings	Discussion, assignments and test
13	Diffraction	a. Fraunhofer diffraction b. The Diffraction grating c. Fresnel diffraction	Discussion, assignments and test
14,15	Polarization	a. Mathematical representation of polarized light b. Polarization by selective absorption c. Polarization by scattering d. Double refraction	Discussion, assignments and test
16	Optical Instrumentation	a. Eyes b. Prisms c. The Camera d. Microscope e. Telescope	Discussion, assignments and test

Evaluation:

Components	Portion (%)
Assignments	20%
Attendance	10%
Participation	20%
Midterm examination	25%
Final Examination	25%