University of New Mexico
Department of Physics and Astronomy

PHYC/ECE 463, Advanced Optics I
www.optics.unm.edu/sbahae/PHYC463/

Instructor: Mansoor Sheik-Bahae, Room 1109 (North Wing),
Tel: 277-2080, e-mail: msb@unm.edu
Text: Optics, by M.V. Klein and T.E. Furtak, , Wiley & Sons Inc.
Other References: *(elementary)* Optics, by E. Hecht, Adison-Wesley Publishing Company,
(advanced) Principles of Optics, by Born & Wolf, Pergamon Press
Grading: Midterm 35% , Final: 35% , weekly homework: 30%
Office hours: Wednesdays, 2-3 pm. or by appointment
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Tentative Syllabus

1- Introduction

-electromagnetic theory, Maxwell's equations
-modern developments (relativistic optics, quantum optics)

2- Optics of Planar Interfaces
-Maxwell's equations in matter
-reflection and transmission (Fresnel's Laws)
-prism optics
-dielectric waveguides

3- Geometrical Optics
-ray tracing
-imaging (spherical and aspherical surfaces, thin lenses, mirrors,..)
-paraxial optics
-matrix method
-thick lenses
-examples of optical systems (human eye, telescopes, microscopes, ...)
-aberration

5- Interference
-two-beam and multi-beam interference
-interferometers, applications

6- Polarization
-states of polarization
-polarizers, waveplates
-matrix techniques
-crystal optics, tensor properties

7- Diffraction (introductory)