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PROPOSAL COVER SHEET

University-Wide Undergraduate Curriculum Committee

CC

PROPOSAL

Program Name

Program Deletion*

Approvals/Signatures

Syllabus of Record for EOPT 110

EOPT 110 Geometric Optics 2 lecture hours

C. Refraction at Plane Surfaces (2 hrs)
   1. Law of Refraction and Snell's Law:
   2. Total Internal Reflection (TIR).
   3. Refraction in a Prism.
   4. Color Dispersion.

D. Prisms (2.5 hrs).
   1. Types of Prisms and Terms Relevant to Prisms.
   2. Ray Tracing through Prisms.

E. Refraction at Spherical Surfaces (2 hrs)
   1. Concave and Convex Surfaces.
   2. Thick Lenses vs. Thin lenses.

F. Imaging with a Single Lens (3 hrs)
   1. Definition of a Thin Lens.
   2. Converging Lenses, Diverging Lenses, and Lens Types.
   3. Thin Lens Equation.
   4. Virtual and Real Images.
   5. Lensmaker's Equation.

G. Imaging with Multiple Lenses (2.5 hrs)
   1. Graphical and Analytical Solutions for Multiple lenses.

H. Optical Systems (3 hrs)
   1. The Simple Magnifier.
   2. Compound Microscope.
   3. The Astronomical Telescope.
   4. The Reflecting Telescope.
   5. Catadioptric Systems (i.e. those with both mirrors and lenses).
   6. Binoculars.
   7. Cameras.

I. [redacted]

Testing (2 hrs)

III-B. Course Outline for Labs (14 labs, 3 hours per lab)

A. Introduction (1 lab)
1. Lab Safety
2. Lab Practices

with specified refractive index, n, and radius of curvature R, determine the following:

a. Angle of refraction of the given light ray, analytically, from Snell's law.

b. Angle of refraction of the given light ray, experimentally, using a laser and

screen investigate the aberration due to the spherical shape of the lens.

2. Investigate the chromatic aberration of two different lenses.
3. Investigate astigmatism of a lens.

L. F-Stops and Apertures (1 lab)

1. Determine graphically, analytically, and experimentally the exit pupil, entrance pupil, and aperture stop for two lenses with a stop placed between them.

VI. Special resource requirements

None

VII. Bibliography

Booth, K. and Hill, S., *The Essence of Optoelectronics (Essence of Engineering),* Pearson Ptr., 1998

Fowler, G., *Introduction to Modern Optics*, Dover, 1989

Jenkins, Francis A. and White, Harvey E., *Fundamentals of Optics, 4th Ed.*, McGraw Hill, New York, 1976

Lipson, H.; Tannhauser, D.; Lipson, S., *Optical Physics, 3rd Ed.*, Cambridge, 1995

Meyer-Arendt, Jurgen; *Introduction to Classical and Modern Optics, 4th Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 1995

A3 This course has not been offered on a trial basis at IUP.

A4 This course is not intended to be dual level.

A5 This course is not to be taken for variable credit.

A6 Similar courses are offered at these institutions:

1. Cincinnati Technical College; Cincinnati, Ohio
   LOT 6720 Geometrical and Wave Optics
2. Indian Hills Community College; Ottumwa, Iowa
   LE 254V Geometrical and Wave Optics
3. Monroe Community College; Rochester, New York
   OPT 131 Optical Elements and Ray Optics
4. Pueblo Community College; Pueblo, Colorado
   PHV 234 Geometric Optics
5. Springfield Technical Community College; Springfield, Massachusetts
   EL 330 Geometrical Optics
6. Texas State Technical College; Waco, Texas
   LET 205 Geometrical Optics II
7. Three Rivers Community / Technical College; Norwich, Connecticut
   PHY 140 Geometric Optics

A7 As far as is known, the contents or skills of this proposed course are not recommended or required by a professional society, accrediting authority, law or other external agency.

C2 Other Resources

a. Space

It is anticipated that a new building will be constructed at the North Pointe (Slate Lick) site before this program starts in the Fall of 2002. This building will house the Electro-Optics program. If the building is not ready by Fall of 2002 the program will be housed in the Electro-Optics Center (EOC) located in the West Hills.