

OPH 142 OPTICAL THEORY II

COURSE DESCRIPTION:

Prerequisites: OPH 141

Corequisites: None

This course continues the study of optical theory begun in OPH 141. Topics include intermediate and advanced theory and formulas. Upon completion, students should be able to perform intermediate and advanced optical calculations. Course Hours Per Week: Class, 3. Semester Hours Credit, 3.

COURSE OBJECTIVES:

Upon completion of the course, the student will be able to:

- a. Perform slab off calculation
- b. Convert between various prism notations.
- c. Discuss lens aberrations
- d. Perform lens reflection and absorption calculations.
- e. Discuss the effects of pantoscopic tilt and face form on effective lens power.
- f. Perform thin lens ray tracing and demonstrate image formation.
- g. Discuss thick lens image formation.
- h. Identify common types of multi-lens systems.
- i. Perform lens magnification calculations.

OUTLINE OF INSTRUCTION:

- I. Lens aberrations
- II. Anisometropia
 - A. Spectacle magnification
 - B. Bicentric grind
- III. Fresnel's formula for lens reflection
- IV. Lens absorption and transmission
- V. Martin's formula for tilt

- VI. Ray tracing and image formation
 - A. Thin lenses
 - B. Thick lenses
 - C. Mirrors
 - D. Microscopes and telescopes

- VII. Prism notation
 - A. Horizontal and vertical components
 - B. Perscriber's notation
 - C. Laboratory notation

REQUIRED TEXTBOOKS AND MATERIALS:

Stoner, Perkins, & Ferguson. Optical Formulas Tutorial. 2nd ed. Elsevier, 2005.

Non-programmable calculator, containing sine, cosine and tangent functions.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 919-536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1209.