

**OPH 102**  
**OPHTHALMIC LAB CONCEPTS**

**COURSE DESCRIPTION**

Prerequisites: OPH 141 and Enrollment in the Optical Apprentice Certificate program

Corequisites: None

This course introduces the operations of the ophthalmic laboratory. Emphasis is on surfacing and finishing formulas; materials, procedures, and equipment used to fabricate glasses; and ANSI, EPA, and OSHA requirements. Upon completion, students should be able to perform laboratory-related calculations, describe safety and environmental regulations, and identify materials and procedures used in ophthalmic laboratories. Course Hours Per Week: Class, 2. Semester Hours Credit, 2.

**COURSE OBJECTIVES:**

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

- a. Describe layout and blocking for surfacing and finishing of single vision and multifocal lenses.
- b. Describe surfacing procedures.
- c. Describe finishing procedures.
- d. Use formulas involved in surfacing and finishing operations.
- e. Neutralize single vision, multifocal, and prismatic eyewear.

**OUTLINE OF INSTRUCTION:**

- I. Laboratory safety
  - A. Clothing safety
  - B. Eye safety
  - C. MSDS sheets, OSHA and EPA requirements
  
- II. Lens design
  - A. Plus, minus, compound lens characteristics
  - B. Optical power cross
  - C. Single vision and multifocal lens designs
  - D. Measurements and terminology
  - E. Indices of common Ophthalmic materials

- III. Lensmeter
  - A. Lensmeter nomenclature and operation
  - B. Neutralizing spherical, compound and multifocal lenses
  - C. Optical Center and Major Reference Point (Prism Reference Point)
  - D. Prism base notation and identification
  - E. ANSI standards for power, axis, and prism
  
- IV. Geneva Lens Measure
  - A. ANSI standards for curves
  
- V. Surfacing procedures
  - A. Base Curve selection using formulas and tables
  - B. Layout and markup of spherical, compound and multifocal lenses
  - C. Blocking procedures---lens preparation
  - D. Tool curves and tool selection
    - 1) Nominal power formula
    - 2) True power formula
  - E. Generating lenses---operation of generator
  - F. Emeries and polishing compounds
  - G. Handling of common ophthalmic materials
  - H. Inspection of finished lenses
  
- VI. Basic formulas
  - A. Sag (thickness)
  - B. Lens center and edge thickness calculations
  - C. Transposition
  - D. Oblique meridian (Tables and sine squared method)
  
- VII. Prism applications
  - A. Prism base direction notation
  - B. Prism formulas
    - 1) Prentice Rule
    - 2) Prism thickness
  - C. Grinding prism for decentration
  - D. Grinding requested prism
  - E. Yoked prism or prism thinning
  - F. Correcting unwanted prism thinning
  - G. Bicentric grind
  
- VIII. Edging Processes
  - A. Minimum blank size calculations
  - B. Lay-out and mark-up for edging
  - C. Patterns and pattern making
  - D. Edging equipment
  - E. Methods of handling common ophthalmic materials
  - F. Beveling

- G. Mounting lenses
- H. Interpreting prescriptions of multifocal lenses
  - 1) Measurements and calculations
  - 2) Franklin style bifocal design
- I. Layout using boxing system
- J. Mark-up and blocking multifocal lenses
- K. Heat and chemical tempering of glass lenses
- L. Lens tinting-dyes and their application
- M. Benchwork
- N. Progressive lens finishing
- O. Final Inspections
  - 1) ANSI standards

### **REQUIRED TEXTBOOKS AND MATERIALS:**

Brooks. Understanding Lens Surfacing. Butterworth-Heinemann, 1992.

Brooks. Essentials for Ophthalmic Lens Finishing. 2<sup>nd</sup> ed. Elsevier, 2003.

### **EQUIPMENT REQUIRED:**

Non-programmable Scientific Calculator. The least complicated calculator that contains the keys 'sin,' 'cos,' and 'tan' will do.

### **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 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.