

**J. Sargeant Reynolds Community College**  
**Course Content Summary**

**Course Prefix and Number:** OPT 121

**Credits:** 3

**Course Title:** Optical Theory I

**Course Description (including lecture hours, lab hours, total contacts)**

Introduces theory and application of ophthalmic lenses. Presents history, basic manufacturing and quality standards of ophthalmic lenses, propagation of light, refraction and dioptic measurements, true power, surface power, nominal lens formula. Explains lens makers' equation, boxing system, spherical lens design, fundamental aspects of cylindrical lenses, sphero-cylinder lens design, and flat and toric transposition. Lecture 3 hours per week

**General Course Purpose**

This course is designed to provide students with a knowledge base of optical theory principles to enable them to function as effective opticians.

**Course Corequisites:**

OPT 150 and OPT 152, or equivalent

**Course Objectives**

Upon completing the course, the student will be able to:

- A. Perform basic algebraic and trigonometric procedures
- B. Demonstrate knowledge of the metric system
- C. State the theories of light
- D. State the laws of refraction and reflection
- E. Calculate lens powers
- G. Demonstrate knowledge of lens characteristics
- H. Work transposition and optical cross problems
- I. Recognize lens forms and shapes
- J. Demonstrate knowledge of vertex compensation
- K. Ability to recognize refractive errors

**Major Topics to be Included**

- A. The 3 O's; Basic Math Review
- B. Theories of Light
- C. Absorption, Refraction and Reflection
- D. Snell's Law, Focal Length & Power
- E. Refraction through a Lens
- F. Basic Optical Formulas
- G. Lens Characteristics
- H. Transposition & Compound Lenses
- I. Prescription Notation, Spherical Equivalent
- J. True and Marked Power

**Effective Date of Course Content Summary (Month, Date Year):** August 1, 2008