BROWARD COLLEGE
COURSE OUTLINE

LAST REVIEW: 2009-2010 **NEXT REVIEW:** 2014-2015 **STATUS:** A

COURSE TITLE: REFRACTOMETRY

COMMON COURSE NUMBER: OPT 2375

CREDIT HOURS: 2

CONTACT HOUR BREAKDOWN

Lecture: 32 Lab:
Clinic: Other:

PREREQUISITE(S): OPT 1110, OPT 1110L, OPT 1210
COREQUISITE(S):
PRE or COREQUISITE(S): OPT 1150, OPT 1150L, OPT 1330, OPT 2879

COURSE DESCRIPTION:
This course reviews the theory and terminology used in determining the powers of corrective lenses in relation to a patient's refractive errors are discussed. Emphasis will be placed on the Phoroptor, retinoscope, and automated refraction instruments. Problems associated with the change in refractive powers will also be discussed.

UNIT TITLES

1 OPTICS OF REFRACTOMETRY
2 ANATOMY AND REFRACTIVE STATUS
3 ASTIGMATISM AND STRUM'S CONOID
4 VISUAL ACUITY TESTING (REVIEW)
5 STREAK RETINOSCOPY
6 MANUAL AND AUTOMATED PHOROPTER
7 SUBJECTIVE TESTING
8 BINOCULAR BALANCE
9 "SIDE-TRIPS"
10 NEAR VISION TESTING
11 FUNCTIONAL TESTING
12 REFRACTIVE COMPLAINTS
13 ADVANCED REFRACTIVE PROBLEMS

OPT 2375

Unit 1 OPTICS OF REFRACTOMETRY

General Outcome:

1.0 The student shall: review the basic theory of optics and light and how they are applied to vision.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

1.1 Define light and discuss its importance to vision.
1.2 Discuss the origin of light.
1.3 Describe four instances when sunlight can be harmful to the eye.
1.4 Compare and contrast ultraviolet radiation, visible light and infrared radiation as far as wavelength range and effect on the human eye.
1.5 List the three (3) types of UV radiation and discuss how each affects the human eye.
1.6 Illustrate where red, blue, and yellow light are focused relative to the retina in a normal eye.
1.7 Explain how the human eye perceives color by contrasting color "additors" with color "subtractors".
1.8 Compare and contract regular and irregular reflections.
1.9 Illustrate graphically the law of reflection.
1.10 Define and diagrammatically illustrate the optical phenomenon of refraction.
1.11 Draw a ray diagram illustrating image formation by both a convex and concave lens**.**

Unit 2 ANATOMY AND REFRACTIVE STATUS

General Outcome:
2.0 The student shall: have an understanding of anatomy of the eye with special emphasis on refractive errors.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

2.1 Identify the basic parts of the human eye.
2.2 Relate specific parts of the eye to their function in refraction and vision.
2.3 Discuss various refractive states of the human eye.

Unit 3 ASTIGMATISM AND STRUM'S CONOID

General Outcome:

3.0 The student shall: be able to identify and compare various types of astigmatism and how to correct them.

OPT 2375

Unit 3 ASTIGMATISM AND STRUM'S CONOID continued

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

3.1 Describe the various types of astigmatism associated with vision.
3.2 Determine what type of lens will correct for the various types of astigmatism.
3.3 Describe and relate the Conoid of Strum to vision and astigmatism.
3.4 Determine the prescription of a spherical equivalent problem.

Unit 4 VISUAL ACUITY TESTING (REVIEW)

General Outcome:

4.0 The student shall: review the procedures for taking a visual acuity on a normal patient.
Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

4.1 Discuss the methods for performing standard Snellen chart acuity testing at both near and far.
4.2 Compare and contrast three (3) other commonly used acuity testing charts..
4.3 Interpret the meaning of the standard Snellen notation.
4.4 Discuss other factors that influence acuity testing.
4.5 Explain the use of contrast sensitivity testing.

Unit 5 STREAK RETINOSCOPY

General Outcome:

5.0 The student shall: be able to understand the theory of an objective refraction.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

5.1 Explain how to use a retinoscope.
5.2 Discuss the process of streak retinoscopy.
5.3 Differentiate between streak and spot retinoscopy.
5.4 Differentiate between static and dynamic retinoscopy.
5.5 Understand the use of a "working lens".
5.6 Describe the various motions that determine a refractive error.
5.7 Explain the concept of "far point" in determining refractive error.
5.8 Describe neutralization of the refractive error and the "dead zone".
5.9 Explain the use of cycloplegic in retinoscopy.
5.10 Differentiate between a retinoscopic refraction and a manifest refraction.

OPT 2375

Unit 6 MANUAL AND AUTOMATED PHOROPTER

General Outcome:

6.0 The student shall: be able to identify all of the parts and controls of the modern phoropter. The automated phoropter will also be discussed

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to

6.1 List and describe the parts and controls of the phoropter.
6.2 Discuss the proper positioning of the patient.
6.3 Discuss how the phoropter can be used in vision testing.

Unit 7 SUBJECTIVE TESTING

General Outcome:

7.0 The student shall: gain knowledge in the process of subjectively testing a patients vision and using the phoropter to improve visual acuity.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

7.1 Describe the procedure to determine maximum plus power to achieve maximum visual Acuity.
7.2 Compare three (3) end-points of the initial refraction.
7.3 Discuss the use of the Jackson Cross-Cylinder test.
7.4 List the steps for basic prescription modification.
7.5 Describe the proper method of recording refraction results.

Unit 8 BINOCULAR BALANCE

General Outcome:

8.0 The student shall: describe the steps and the desired outcomes for binocular balance.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

Unit 8 BINOCULAR BALANCE continued

8.1 List the steps for binocular balance testing.
8.2 Discuss the criteria for a reliable end-point.
8.3 Explain why end point data may not be reliable.
8.4 Describe the procedure when a patient is unresponsive to binocular balance.
8.5 Describe the effect of binocular balance on accommodation.

Unit 9 "SIDE-TRIPS"

General Outcome:

9.0 The student shall: discuss the need for refractive "side-trips"

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

9.1 Explain the use of the clock chart in determining astigmatism.
9.2 Describe the Jackson Cross-Cylinder method for finding uncorrected astigmatism.
9.3 Determine the method and usage of the prism-dissociated duochrome test.
9.4 Discuss when the sighting dominance check is used.
9.5 Explain the procedure used for trial frame refractions.
9.6 Compare stenopaic slit refraction with other methods of finding and correcting astigmatism.
9.7 Determine when a cycloplegic refraction is needed.

Unit 10 NEAR VISION TESTING

General Outcome:

10.0 The student shall: gain knowledge in the procedure for testing the reading acuity of a patient. Emphasis will be placed on using the phoropter for best near visual acuity.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

10.1 Compare several methods of determining the near prescription for a presbyope.
10.2 Explain the procedure for dynamic cross-cylinder testing.
10.3 Discuss the use of refractive charts based on patients' age.
10.4 Define "split add" and discuss when it is used.
10.5 Describe the need for a trifocal.

OPT 2375

Unit 11 FUNCTIONAL TESTING

General Outcome:

11.0 The student shall: be able to discuss the influence of accommodation and vergence on the refractive state and prescription.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

11.1 Explain distance lateral and vertical phoria by Von Graefe technique.
11.2 Discuss the methods for testing horizontal and vertical vergence at distance and near.
11.3 Compare and contrast the Von Graefe and vergence techniques.
11.4 List the steps for testing phoria and tropia.

Unit 12 REFRACTIVE COMPLAINTS

General Outcome:

12.0 The student shall: have an understanding of the diagnostic process in dealing with patients that have a complaint with their prescription.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

12.1 Explain how to pin point the problem.
12.2 Determine if the problem is prescription or fitting oriented.
12.3 Discuss how base cure differences can effect vision and comfort.
12.4 Describe prismatic effect of a prescription how induced prism can cause problems.
12.5 Describe the effect of over “plussing” the near prescription.
12.6 Explain the various types of problems associated with bifocals.
12.7 Compare frame problems in relation to fit and to cosmetic appearance.
12.8 Determine if the visual problem is functional or physiological.

Unit 13 ADVANCED REFRACTIVE PROBLEMS

General Outcome:

13.0 The student shall: be able to discuss special problems that may confront the refractionist.

Specific Measurable Learning Outcomes:
Upon successful completion of this unit, the student shall be able to:

OPT 2375

Unit 13 ADVANCED REFRACTIVE PROBLEMS continued

13.1 Explain how to pin point the problem.
13.2 Determine if the problem is prescription or fitting oriented.
13.3 Discuss how base cure differences can affect vision and comfort.
13.4 Describe prismatic effect of a prescription how induced prism can cause problems.
13.5 Describe the effect of over “plussing” the near prescription.