

# BROWARD COLLEGE COURSE OUTLINE

**LAST REVIEW: 2007-2008**

**NEXT REVIEW: 2012-2013**

**STATUS: A**

**COURSE TITLE:** OPHTHALMIC LENSES

**COMMON COURSE NUMBER:** OPT 1150

**CREDIT HOURS:** 2

## CONTACT HOUR BREAKDOWN

**CLOCK HOURS:**

Lecture: **32**

Lab:

Clinic:

Other:

**PREREQUISITE(S):** OPT 1110, OPT 1110L, OPT 1210

**COREQUISITE(S):** OPT 1150L, OPT 2090

**PRE/COREQUISITE(S):**

## COURSE DESCRIPTION:

Characteristics of single vision and multifocal lens reference points for proper lens selection to meet visual needs of the patients. Emphasis is on accurate positioning of the optical centers and selected multifocal addition design. ANSI and F.D.A. standards; prescription ordering; verification procedures; and absorptive lenses are presented. Low vision devices and occupational specialty lenses will be discussed.

## UNIT TITLES:

- 1 LENS FORM AND TYPE
- 2 OPTICAL CENTER PLACEMENT AND MULTIFOCAL HEIGHT
- 3 INTERPUPILLARY DISTANCE
- 4 FRAME SELECTION IN RELATION TO PRESCRIPTION REQUIREMENTS
- 5 ORDERING AND VERIFICATION OF LENSES
- 6 MULTIFOCAL, INVISIBLE, AND OCCUPATIONAL SPECIALTY SEGMENTS
- 7 ABSORPTIVE LENSES
- 8 ANSI AND F.D.A. STANDARDS
- 9 ANGULAR AND SPECTACLE MAGNIFICATION
- 10 ASTIGMATISM -- ON AXIS
- 11 ASTIGMATISM -- DIOPTRIC POWER AND OFF AXIS MERIDIANS
- 12 SCATTERING, DISPERSION, AND POLARIZATION
- 13 LOW VISION DEVICES
- 14 NON-OPTICAL LOW VISION AIDS

# BROWARD COLLEGE COURSE OUTLINE

## OPT 1150

### **Unit 1 LENS FORM AND TYPE**

#### **General Outcome:**

- 1.0 The student shall:** gain a working knowledge of the different forms a lens can have. Application of these forms in correction of vision will be emphasized.

#### **Specific Measurable Learning Outcomes:**

##### **Upon successful completion of this unit, the student shall be able to:**

- 1.1 Identify nine (9) lens shapes.
- 1.2 Solve for refractive power of thin lenses.
- 1.3 Apply the thick lens formula.
- 1.4 Discuss how the properties of thin lenses change in different media.
- 1.5 Explain the “reduced eye” model.

### **Unit 2 OPTICAL CENTER PLACEMENT AND MULTIFOCAL HEIGHT**

#### **General Outcome:**

- 2.0 The student shall:** be able to discuss the fine points of lens positioning and general fitting practice.

#### **Specific Measurable Learning Outcomes:**

##### **Upon successful completion of this unit, the student shall be able to:**

- 2.1 Describe how a frame should be positioned before optical center measurements are made.
- 2.2 Differentiate between correct bridge size and correct eyewire size.
- 2.3 Determine horizontal optical center placement.
- 2.4 Calculate prismatic effect using Prentice’s Rule.
- 2.5 Determine vertical optical center placement.
- 2.6 Compensate for vertex distance in determining the effective power of a lens.
- 2.7 Differentiate between the lower limbus and the lower lid margin method of determining multi-focal height placement.
- 2.8 Differentiate between subjective and objective determination of multi-focal height placement.
- 2.9 Describe how to measure for trifocal height placement.
- 2.10 List the steps in measuring bifocal and trifocal heights.
- 2.11 Discuss alternative methods of determining segment height placement.
- 2.12 Describe the methods used to measure industrial segmented lenses.

# BROWARD COLLEGE COURSE OUTLINE

## OPT 1150

### **Unit 2 OPTICAL CENTER PLACEMENT AND MULTIFOCAL HEIGHT** continued

- 2.13 Determine when it is appropriate to use unequal segment heights.
- 2.14 Discuss special circumstances that must be considered in measuring for a multi-focal lens.
- 2.15 Discuss the influence of vertex distance on apparent segment height.
- 2.16 Discuss prism compensated segments.
- 2.17 Give instructions to the new bifocal and multi-focal wearer.

### **Unit 3: INTERPUPILLARY DISTANCE**

#### **General Outcome:**

- 3.0 The student shall:** be able to discuss the various methods of measuring the distance between a patient's eyes (P.D.), and to determine which method to use.

#### **Specific Measurable Learning Outcomes:**

##### **Upon successful completion of this unit, the student shall be able to:**

- 3.1 Define the terms relating to the measurement of the patient's interpupillary distance (P.D.)
- 3.2 Discuss the various techniques used for determining the distance P.D.
- 3.3 Describe common difficulties in determining the distance P.D. and their solutions.
- 3.4 Explain when a monocular P.D. is required.
- 3.5 Discuss three (3) different instruments used to determine a patient's P.D.
- 3.6 Discuss the various techniques used for determining the near P.D.
- 3.7 Describe how to calculate to determine the near P.D.

### **Unit 4: FRAME SELECTION IN RELATION TO PRESCRIPTION REQUIREMENTS**

#### **General Outcome:**

- 4.0 The student shall:** be able to assist a patient in the selection of frames. Selection criteria will include cosmetic, optical, and frame construction.

#### **Specific Measurable Learning Outcomes:**

##### **Upon successful completion of this unit, the student shall be able to:**

- 4.1 List several factors when considering the cosmetic aspects of frame selection.
- 4.2 Discuss the seven (7) basic facial shapes.
- 4.3 Discuss how frame cosmetics will affect facial cosmetics.
- 4.4 List five (5) basic skin tones and how frame color will enhance facial cosmetics.

# BROWARD COLLEGE COURSE OUTLINE

## OPT 1150

### **Unit 4:** FRAME SELECTION IN RELATION TO PRESCRIPTION REQUIREMENTS continued

- 4.5 Discuss lens accessories.
- 4.6 Determine the effect that bridge design will have on the appearance of the nose.
- 4.7 Compare and contrast frame style and construction when fitting the high minus or high plus lens wearer.
- 4.8 Determine the optical effects of various frame shapes..
- 4.9 Determine the change in effective power of a lens when the frame fit is changed
- 4.10 Differentiate between the different angles of the nose pads and how they affect frame fit.

### **Unit 5:** ORDERING AND VERIFICATION OF LENSES

#### **General Outcome:**

**5.0 The student shall:** be able to follow procedures commonly used when ordering and verifying prescriptions from an optical laboratory.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 5.1 Define terminology used in ordering lenses.
- 5.2 Discuss the methods in filling out various lab forms.
- 5.3 List the steps in verification of lab orders.
- 5.4 Determine lens power.
- 5.5 Discuss the methods used in verifying lens type and measurements.
- 5.6 Discuss the use of a colmascope.

### **Unit 6:** MULTIFOCAL, INVISIBLE, AND OCCUPATIONAL SPECIALTY SEGMENTS

#### **General Outcome:**

**6.0 The student shall:** be able to discuss the use of various types of multi-focal lenses.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 6.1 Describe the various kinds of invisible bifocals.
- 6.2 Discuss the characteristics of progressive addition lenses (PAL).
- 6.3 Compare and contrast the advantages and disadvantages of several types of PALs.
- 6.4 List the criteria for a good PAL candidate.

## **BROWARD COLLEGE COURSE OUTLINE**

### OPT 1150

#### **Unit 6: MULTIFOCAL, INVISIBLE, AND OCCUPATIONAL SPECIALTY SEGMENTS continued**

- 6.5 List the criteria for a good PAL frame.
- 6.6 Explain the procedure for measuring lens placement.
- 6.7 Describe the proper alignment of lens and frame.
- 6.8 Differentiate the fitting techniques of several types of PALs.
- 6.9 Describe the verification process of PALs.
- 6.10 List the various types of occupational lens.
- 6.11 Discuss the fitting criteria for an occupational lens.

#### **Unit 7: ABSORPTIVE LENSES**

##### **General Outcome:**

**7.0 The student shall:** be able to determine which type of absorptive lens will be suited for a particular patient's needs. Fashion will be considered, however, optical considerations will be emphasized.

##### **Specific Measurable Learning Outcomes:**

##### **Upon successful completion of this unit, the student shall be able to:**

- 7.1 Discuss how absorptive lenses are classified.
- 7.2 Describe the effects of ultraviolet light on ocular tissue.
- 7.3 Describe the effects of infrared light on ocular tissue.
- 7.4 Differentiate between the absorption characteristics of crown glass versus conventional plastic (CR-39).
- 7.5 Determine the amount of absorption required for a specific task.
- 7.6 Discuss the transmission curves for various standard tints in glass and plastic.
- 7.7 Compare and contrast the advantages and disadvantages of the various standard tints in glass and plastic.
- 7.8 Explain the function of Anti-reflection coating on pre-tinted lenses.
- 7.9 Explain the function of mirror coating.
- 7.10 Determine the benefits of edge coating on thick minus lenses.
- 7.11 Define photochromatic lenses.
- 7.12 Discuss the factors that influence photochromic transmission.
- 7.13 Differentiate between chemical tempering and heat tempering photochromatic lenses.
- 7.14 Discuss polarizing lens.
- 7.15 Explain the indications and contra-indications of a polarizing lens.

# BROWARD COLLEGE COURSE OUTLINE

## OPT 1150

### **Unit 8: ANSI AND F.D.A. STANDARDS**

#### **General Outcome:**

**8.0 The student shall:** be able to discuss the American National Standards Institute (ANSI) and the Federal Drug Administrations (FDA) rules and regulations regarding the manufacture and sale of ophthalmic devices.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 8.1 Differentiate between a standard and a law.
- 8.2 List the ANSI standards for dress and safety eyewear.
- 8.3 Discuss the FDA policy on safety and glass.

### **Unit 9: ANGULAR AND SPECTACLE MAGNIFICATION**

#### **General Outcome:**

**9.0 The student shall:** be able to describe how angular and spectacle magnification can be used to increase a patient's useable vision.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 9.1 Explain relative size magnification.
- 9.2 Discuss angular magnification.
- 9.3 Relate relative distance magnification to spectacle magnification.
- 9.4 Explain why a plus lens can be used as a simple magnifier.
- 9.5 Describe a collimating magnifier.
- 9.6 Calculate the power of a simple magnifier.
- 9.7 Describe the optics of a telescope and a microscope.
- 9.8 Discuss magnification terminology.
- 9.9 Explain aperture stop and entrance pupil.
- 9.10 Explain exit pupil and blurred image sizes.
- 9.11 Describe thin lens spectacle magnification.
- 9.12 Describe telescope concepts and spectacle magnification.
- 9.13 Relate shape and power factors.
- 9.14 Describe relative spectacle magnification.

OPT 1150

**Unit 10: ASTIGMATISM -- ON AXIS**

**General Outcome:**

**10.0 The student shall:** be able to discuss how a cylindrical and spherocylindrical lens corrects astigmatism.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 10.1 Define the terms associated with cylindrical lenses.
- 10.2 Explain the seven (7) forms of a cylinder lens.
- 10.3 Describe standard axis notation.
- 10.4 Explain the properties of perpendicularly crossed cylindrical lenses.
- 10.5 Discuss collapsing the conoid by equalizing the cross cylinders.
- 10.6 Explain transposition and equivalent combinations.
- 10.7 Explain toric surfaces.
- 10.8 Describe the circle of least confusion and spherical equivalent.
- 10.9 Explain the classification and correction of astigmatism.
- 10.10 Describe the clock dial chart.
- 10.11 Compare accommodation and spherocylindrical corrections.
- 10.12 Discuss the power and shape factors of spectacle magnification.

**Unit 11: ASTIGMATISM -- DIOPTRIC POWER AND OFF AXIS MERIDIANS**

**General Outcome:**

**11.0 The student shall:** be able to calculate the power of a spherocylinder lens at any off-axis meridian.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 11.1 Explain curvature and torsion.
- 11.2 Discuss the dioptric power components of a spherocylinder lens.
- 11.3 Calculate for obliquely crossed spherocylinder lenses.
- 11.4 Describe an "over-refraction".
- 11.5 Explain the residual refractive error.
- 11.6 Describe axis refinement with a Jackson cross cylinder.

OPT 1150

**Unit 12: SCATTERING, DISPERSION, AND POLARIZATION**

**General Outcome:**

**12.0 The student shall:** be able to discuss advanced theories of lens aberrations.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 12.1 Explain incoherent scattering.
- 12.2 Discuss Rayleigh scattering.
- 12.3 Explain intraocular light scatter.
- 12.4 Compare scattering and selective absorption.
- 12.5 Explain resonance scattering.
- 12.6 Discuss dispersion.
- 12.7 Discuss polarization and plane rotation.
- 12.8 Explain polarization by scattering.
- 12.9 Describe circular polarization.
- 12.10 Discused binocular vision and polarized light.

**Unit 13: LOW VISION DEVICES**

**General Outcome:**

**13.0The student shall:** be able to discuss low vision device fitting practices.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 13.1 Define low vision.
- 13.3 Describe the types of low vision aids available.
- 13.3 Discuss the fitting criteria for low vision aids.

**Unit 14: NON-OPTICAL LOW VISION AIDS**

**General Outcome:**

**14.0 The student shall:** be able to describe ways in which a low vision patient can be helped with out the use of optical devices.

# BROWARD COLLEGE COURSE OUTLINE

## OPT 1150

### **Unit 14:** NON-OPTICAL LOW VISION AIDS continued

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 14.1 Define non-optical low vision aids.
- 14.2 Discuss the Federal Aid to the low vision patient.
- 14.3 Describe community resources available to the low vision patient.
- 14.4 Discuss the dispensing of non-optical aids.