

OPT-1400: INTRODUCTION TO FABRICATION PRINCIPLES

Cuyahoga Community College

Viewing: OPT-1400 : Introduction to Fabrication Principles

Board of Trustees:

January 2024

Academic Term:

Fall 2024

Subject Code

OPT - Optical Technology

Course Number:

1400

Title:

Introduction to Fabrication Principles

Catalog Description:

Basic understanding of ophthalmic prescriptions and lenses. Use of ophthalmic equipment to neutralize and verify single vision, multifocal, and progressive addition lenses. Introduction to the skills necessary to meet accepted opticianry standards, including laboratory safety, personal safety, and instrument maintenance.

Credit Hour(s):

1

Lecture Hour(s):

.5

Lab Hour(s):

1.5

Requisites

Prerequisite and Corequisite

Departmental approval: admission to program.

Outcomes

Course Outcome(s):

Analyze spectacle prescriptions.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Describe how sphere, cylinder, axis, add power, and prism pertain to ophthalmic prescriptions.
2. Determine the sphere, cylinder, and axis of a prescription using the lensometer.

Course Outcome(s):

Calculate the power of a spectacle lens using the lensometer.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

1. Determine sphere power.
2. Calculate cylinder power.
3. Identify axis.
4. Determine add power.

Course Outcome(s):

Inspect single vision spectacles to determine if they are fabricated within the standards put forth by the American National Standards Institute.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Perform final inspection of single vision eyewear.
2. Demonstrate correct operation of optical machinery.

Course Outcome(s):

Maintain and operate instruments and optical machines in accordance with industry safety regulations.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Discuss American National standards Institute\Occupational Safety and Health Administration (ANSI\OSHA) standards for operating and maintaining optical machinery and instruments.
2. Use proper safety equipment when working in the laboratory.
3. Demonstrate correct operation of optical machinery.
4. Demonstrate ability to maintain optical equipment.

Methods of Evaluation:

1. Exams
2. Laboratory projects
3. Homework
4. Attendance

Course Content Outline:

1. Understanding spectacle prescriptions
 - a. Sphere power
 - b. Cylinder power
 - c. Axis
 - d. Add power
 - e. Prism
2. Transposition of spectacle prescriptions
3. Anatomy of the Lensometer
 - a. Chrome knurled sleeve
 - b. Cylinder axis wheel
 - c. Eyepiece
 - d. Gimbal
 - e. Ink pad
 - f. Lens holder
 - g. Lens stop

- h. Marking device
 - i. Mires
 - j. Power drum
- k. Prism compensating device
- l. Reticle
- m. Spectacle table
- 4. Lensometry
 - a. Single vision
 - i. Determine sphere power
 - ii. Figure cylinder power
 - iii. Identify axis
 - b. Segmented multifocal
 - i. Determine sphere power
 - ii. Figure cylinder power
 - iii. Identify axis
 - iv. Determine add power
 - c. Progressive Addition Lenses
 - i. Determine sphere power
 - ii. Figure cylinder power
 - iii. Identify axis
 - iv. Determine add power
- 5. Basic inspection of ophthalmic lenses
 - a. Verification of sphere power
 - b. Verification of cylinder power
 - c. Verification of axis
 - d. Verification of prescribed prism
- 6. American National Standards Institute standards pertaining to eyewear
 - a. Pertaining to dress eye wear: Z 80
 - i. Z 80 standard: sphere power
 - ii. Z 80 standard: cylinder power
 - iii. Z 80 standard: spherocylinder power
 - iv. Z 80 standard: axis
 - b. Pertaining to safety eye wear
 - i. Z 87 frame requirements
 - ii. Z 87 lens requirements
- 7. Safety procedures and practices

Resources

Bhootra, Ajay Kumar. (2018) *Optician's guide: A manual for opticians*, Jaypee Brothers Medical Publishers.

Brooks, Clifford. (2003) *Essentials of ophthalmic lens finishing*, Stoneham, MA: Butterworth-Heinemann.

Brooks, Clifford W. (2023) *System for ophthalmic dispensing*, Elsevier.

Ferguson, Roy R. . *Ophthalmic essentials*. 1st. Lakeland, TN: Opticians Association of America, 2015.

National Academy of Opticianry. *Ophthalmic dispensing review book*. National Academy of Opticianry, 2019.

Stoner, Ellen, et al. (2005) *Optical formulas tutorial*, Elsevier.

Resources Other

1. 20/20 <https://www.2020mag.com/>
2. American Optometric Association. <https://www.aoa.org/patients-and-public/caring-for-your-vision/contact-lenses?sso=y> (<https://www.aoa.org/patients-and-public/caring-for-your-vision/contact-lenses/?sso=y>)
3. Centers for Disease Control and Prevention. "Healthy Contact Lens Wear and Care." <https://www.cdc.gov/contactlenses/index.html> (<https://www.cdc.gov/contactlenses/>)
4. Eyecare Business <https://www.eyecarebusiness.com/>
5. Invision <https://invisionmag.com/>
6. Khan Academy. <https://www.khanacademy.org/>
7. Ophthobook <https://timroot.com/ophthobook/>
8. OptiBoard Forums. <http://www.optiboard.com/forums/>
9. Quantum Optical. <http://www.quantumoptical.com/> (<https://www.2020mag.com/>)
10. Review of Optometry. <https://www.reviewofoptometry.com/>
11. Vision Professionals Board <https://vision.ohio.gov/vision-professionals/optician/3-optician> (<https://vision.ohio.gov/vision-professionals/optician/3-optician/>)

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