OPT-1421: ADVANCED SPECTACLE FABRICATION

Cuyahoga Community College

Viewing: OPT-1421 : Advanced Spectacle Fabrication

Board of Trustees:
May 2024

Academic Term:
Fall 2024

Subject Code
OPT - Optical Technology

Course Number:
1421

Title:
Advanced Spectacle Fabrication

Catalog Description:
Advanced laboratory concepts and manipulative skills required to make a pair of single vision or segmented multifocal eyewear. Topics include laboratory safety, personal safety, and the application of machine and instrument maintenance.

Credit Hour(s):
1

Lecture Hour(s):
0

Lab Hour(s):
3

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
OPT-1411 Basic Spectacle Fabrication.

Outcomes

Course Outcome(s):
Calculate measurements necessary for the fabrication of multifocal spectacles.

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 single vision lens preparation
2. Perform multifocal lens preparation.

Course Outcome(s):
Mark lenses thereby distinguishing lens characteristics necessary for spectacle fabrication.

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 single vision lens preparation.
2. Perform multifocal lens preparation.
3. Demonstrate correct operation of optical machinery.

Course Outcome(s):

Align lenses so that all specifications of the prescription are 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 single vision lens preparation.
2. Perform multifocal lens preparation.
3. Demonstrate correct operation of optical machinery.

Course Outcome(s):

Fabricate aesthetically pleasing multifocal spectacles that are 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. Demonstrate correct operation of optical machinery.
2. Demonstrate correct use of optical instruments.
3. Demonstrate knowledge of edging lenses.
4. Perform edging using ophthalmic laboratory equipment.
5. Demonstrate knowledge of insets and prisms in lenses.
6. Construct multifocal eyewear.

Course Outcome(s):

Inspect single vision and segmented multifocal spectacles to verify that 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. Perform final inspection of multifocal eyewear.
3. Demonstrate correct use of optical instruments.

Course Outcome(s):

Maintain and operate instruments and optical machines in accordance with Occupational Safety and Health Administration 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.

Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

1. Use proper safety equipment when working in the laboratory.
2. Demonstrate correct operation of optical machinery.
3. Demonstrate correct use of optical instruments.
4. Perform edging using modern ophthalmic laboratory equipment.

Course Outcome(s):

Demonstrate professional behavior in an ophthalmic fabrication environment.

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.
Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

1. Perform final inspection of multifocal eyewear.
2. Describe professional behavior in an ophthalmic laboratory setting.
3. Describe national standards that govern the fabrication of spectacles.

Methods of Evaluation:

1. Exams
2. Laboratory projects
3. Assignments
4. Class participation (Professional Behavior Rubric)

Course Content Outline:

1. CONCEPTS:
    a. Understanding multifocal spectacle prescriptions
        i. Sphere power
        ii. Cylinder power
        iii. Axis
        iv. Add
    b. Lensometry
        i. Determine sphere power
        ii. Determine cylinder power
        iii. Determine axis
        iv. Determine add power
    c. Fabrication Formulae
        i. Boxing System
            1. A Measurement
            2. B Measurement
            3. Distance between lenses
            4. Effective Diameter
        ii. Geometric Center
        iii. Geometric Center Distance
        iv. Horizontal lens centration
        v. Minimum Blank Size
        vi. Segment Drop
        vii. Prentice Rule
    d. Finishing lens layout for multifocal lens
    e. Blocking of multifocal lenses

   f. Edging of multifocal lenses
      i. Using automated equipment
      ii. Manual edging
   g. Lens insertion
   h. Nylon cord and other mountings
   i. Standard alignment
   j. Verification of multifocal lenses
      i. Fitting cross
      ii. Distance reference point
      iii. Major reference point
      iv. Prism reference point
      v. Near reference point
   k. Final inspection checklist
   l. Enforcement of American National Standards Institute standards by the Occupational Safety and Health Administration (multifocal lenses)
   m. Environment Protection Agency standards governing opticianry
2. SKILLS:
   a. Perform finishing calculations
   b. Apply finishing calculations to produce the proper lens design
   c. Preparing lens
   d. Edging lens with automated equipment
   e. Edging lens with hand equipment
   f. Perform final inspection of multifocal spectacles
3. ISSUES:
   a. Safety
   b. Refractive errors
   c. Lab rejects and spoilage
   d. Apply knowledge of lens fabrication
   e. Lens materials, aspheric lenses
   f. Enforcement of American National Standards Institute standards by the Occupational Safety and Health Administration

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Resources

Brooks, Clifford W. (1992) *Understanding lens surfacing*, Butterworth-Heineann.

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

Brooks, C. W. (2003) *Essentials of ophthalmic lens finishing*, Elsevier.

Ferguson, Roy R. (2015) *Ophthalmic essentials*, Opticians Association of America.

Stoner, E. 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 Acadamy. 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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