VCT1101 – Ophthalmic Materials I (2 hrs. per week)
Course Outline and Reading Assignment

Text: Optical Formulas Tutorial 2nd edition by Stoner, Perkins and Ferguson
System for Ophthalmic Dispensing, 3rd edition, by Brooks and Borish
Essentials of Ophthalmic Lens Finishing, 2nd edition by Brooks

Week 1- Topic 1: Course introduction, distribution of reading assignments, grading and college policies and Vision Care Technology Department Student Handbook.

Grading: Two class examinations = 30% of final grade
Three writing assignments = 10% of final grade
Final examination = 30% of final grade.
Laboratory = 30% of final grade (70% final grade required in lab to pass course)

Makeup exams will be given with a documented excuse and at the discretion of the instructor.

Attendance and Lateness Policy: Standard college policy (Please refer to college catalog for further details.)

Class Meets 1 time/week Allowable Absence 2 classes
Class Meets 1 time/week Allowable Lateness 4 classes

Office Hours for all full-time and part-time faculty are posted on the department bulletin board in front of P-312

New York City College of Technology Policy on Academic Integrity
Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Topic 2: Introduction to the Ophthalmic Profession

- The three O’s…Who are they? What is their scope of practice?
- What is the future of opticianry compared to optometry and ophthalmology?
- Importance of the AAS Degree
- State and National licensure
- ABO and NCLE Examinations and NYS State Board Practical
- Ophthalmic Dispensing and Contact Lens Certification in NYS
- Commission on Opticianry Accreditation
- NYSSO (New York State Society of Opticians)
- Student Optical Society (Getting Involved)
- Student Awards

**Week 2 - Topics: Metric System, Basic Anatomy of the Eye, Refractive Errors: Emmetropia, Myopia, Hyperopia, Astigmatism, Amblyopia**

Reading Assignment: Metric System (Optical Formulas p. 8-9 and System for Ophthalmic Dispensing, 3rd edition, p. 263)

Reading Assignment: Refractive Errors (Optical Formulas p. 69)

Reading Assignment: PowerPoint Presentation

**Week 3 – Topics: Basics of Light and Characteristics of Plus and Minus Lenses: Hyperopia, Myopia and Astigmatism, Categories of Astigmatism, Diopter and Focal Length**

Reading Assignment: Basics of Light (Optical Formulas p. 24 and Systems p. 273)

Reading Assignment: Characteristics of Plus and Minus Lenses, Hyperopia, Myopia (Optical Formulas, p. 43 and System for Ophthalmic Dispensing, 3rd edition, p. 279-283)

Reading Assignment: Categories of Astigmatism (Optical Formulas p. 69 – 73)

Reading Assignment: Diopter and Focal Length (Optical Formulas p. 45) and System for Ophthalmic Dispensing, 3rd edition, p. 282

**Week 4 – Topics: Types of Ophthalmic Lenses, Refractive Index, Lens Materials, Review of Transposition**

Reading Assignment: Types of Lenses (Optical Formulas p. 47) and Systems p. 287

Reading Assignment: Refractive Index (Optical Formulas p. 27)

Reading Assignment: Transposition (Optical Formulas p. 62) and Systems p. 299

**Week 5- Exam I and 1st Writing Assignment Due**
Week 6 – Review of Exam I, Dispersion and Abbe’ Value

Dispersion Abbe’ Value (Optical Formulas p. 36 and System for Ophthalmic Dispensing, 3rd edition, p. 404)

Week 7 – Topic: Radius of Curvature

Reading Assignment: Radius of Curvature (Optical Formulas p. 48 and Systems p. 312)

Week 8 - Topics: Nominal Lens Power and Lens Maker’s Equation

Reading Assignment: Nominal Lens Power (Optical Formulas p. 50 and System of Ophthalmic Dispensing, 3rd edition, p. 292 and p. 311)

Reading Assignment: Lens Maker’s Equation (Optical Formulas p. 51 and System for Ophthalmic Dispensing, 3rd edition, p. 283)

Week 9 – Exam II and 2nd Writing Assignment Due

Week 10 – Review of Exam II Topics: Sphere/Cylinders and Compound Lenses, Lens Meridians

Reading Assignment: Sphere/Cylinders and Compound Lenses (Optical Formulas p. 52 and System for Ophthalmic Dispensing, 3rd edition, pgs. 305-307)

Week 11-12 – Topics: Continue: Lens Meridians, Optical Cross, Plus and Minus Cylinder Lenses

Reading Assignment: Lens Meridians, Toric Lenses, Optical Cross (Optical Formulas p.53 – 57)

Reading Assignment: Plus and Minus Cylinder Lenses (Optical Formulas p. 57 – 60)

Week 13 - Topics: Base Curves, Power of Cylinder in Oblique Meridians

Reading Assignment: Approximate Base Curves, (Systems, p. 416 and Optical Formulas p. 145 – 147)

Reading Assignment: Power of Cylinder in Oblique Meridians (Optical Formulas p. 75 and System for Ophthalmic Dispensing, 3rd edition, pgs. 288 - 290)

Week 14 – Topics: Continue: Power of Cylinder in Oblique Meridians, Review for Final, 3rd Writing Assignment Due

Week 15 – Final Examination
Text: Optical Formulas Tutorial 2nd edition by Stoner, Perkins and Ferguson
Systems for Ophthalmic Dispensing, 3rd edition, by Brooks and Borish
Essentials of Ophthalmic Lens Finishing, 2nd edition by Brooks

Week 1- Course introduction, Distribution of Reading Assignments, Grading and College Policies, Intro to VCT 1101 Lab and Intro to Lensometry

Students will be given a copy of the department’s laboratory safety handout and will be required to sign the safety handout form.

Grading: Laboratory = 30% of final grade (70% final grade required in lab to pass course)

Attendance and Lateness Policy: Standard college policy (Please refer to college catalog for further details.)

Class Meets 1 time/week  Allowable Absence 2 classes
Class Meets 1 time/week  Allowable Lateness 4 classes

Office Hours for all full-time and part-time faculty are posted on the department bulletin board in front of P-312

Topics: Introduction to VCT1101L laboratory:
- Safety requirements, lab coat requirements with department arm patch, safety eyeglasses, student name tag requirements
- Requirements for purchasing mandatory department tool kit
- Location and importance of MSDS sheets and OSHA requirements for edger waste removal
- Location of First Aid kit, eyewash station and use, demonstration of red shut off switches, Security phone number
- Students will receive a copy of the department’s laboratory safety handout procedures
- Fire exits and emergency evacuation procedures
- Laboratory work procedure including seating assignments and job trays

Introduction to the Lensometer (Focimeter):
- What is a Lensometer?
- Uses of the Lensometer: to determine sphere power, cylinder power, bifocal add power, the axis of the cylinder, the location of the optical center, the amount of prism and the
base direction of the prism. (Students should be aware that bifocal add power and the amount of prism and direction will be covered in VCT1201L.)

- Describe parts of the Lensometer: Eyepiece, Reticle, Lens holder, Ink marker, Inkwell, Spectacle table lever, Spectacle table, Power drum, Lens stop, Cylinder axis wheel
- Placing the lens on the Lensometer table, convex side toward operator
- Verification and centering of plus and minus sphere power lenses.
- Discuss optical center of plus and minus lenses
- Power drum readings and reticle target
- Neutralize spherical single vision lens

Reading Assignment: Department Lensometer Handout, Department Safety Handout System for Ophthalmic Dispensing, 3rd edition, Lensometer basics, p. 92-96


**Week 2 – Topic: Quiz and Lensometry (continued)**

- Quiz on safety procedures as outlined in Safety Handout, MSDS, OSHA requirements
- Review parts of the Lensometer
- Eyepiece adjustment
- Placing the lens on the Lensometer table, convex side toward operator
- Verification and centering of plus and minus sphere power lenses.
- Discuss optical center of plus and minus lenses
- Power drum readings and reticle target
- Neutralize both plus and minus single vision lenses

**Week 3- Topic: Lensometry (continued)**

- Review Lensometer parts and procedures for verifying plus and minus sphere lenses
- Eyepiece adjustment
- Placing the lens on the Lensometer table
- Verification and determining cylinder power component minus cylinder direction
- Introduction to cylinder axis drum
- Power drum readings and lens Rx power in minus cylinder direction
- Dotting up optical centers of lenses with either plus or minus sphere lenses with cylinder power in a minus cylinder axis
- Neutralize both plus and minus cylindrical lenses in minus cylinder power

**Week 4- Topic: Transposition of Optical Lens Powers and Lensometry Review**

- Transposition of Optical Lens Powers
- Discuss and practice calculating from minus to plus and back
- Show minus to plus on the Lensometer and practice moving from one form to the other
- Continue Lensometry practice
- Focus the eyepiece and set up cylinder lens for neutralization in minus cylinder form
- Verification and determining cylinder power component minus cylinder direction
- Power drum readings and lens Rx power in minus cylinder direction
- Dotting up optical centers of lenses with either plus or minus sphere lenses with cylinder power in a minus cylinder axis
- Neutralize both plus and minus cylindrical lenses in minus cylinder power

Week 5 – Exam I and Topic: Frame Measurements and Frame Markings, Boxing System, Effective Diameter MBS (Minimum Blank Size), Pupillary Measurements, Frame Measurements and Decentration Calculations, Lens layout and markup

- Describe the parts of a frame and frame markings on a plastic frame. These will include: Datum Line, “A” measurement, “B” measurement, “GC” Geometric Center, “DBL” Distance between lenses, “DBC” Distance between centers, “OTL” Overall temple length, “LTB” Length to Bend, “FTB” Front to Bend. In addition, the Boxing System will be discussed and illustrated.
- Lens markup based on pupillary measurements, frame measurements and decentration needed based on frame selection
- Prepare job ticket for single vision lenses based on pupillary measurements, frame measurements and decentration
- Lens layout for blocking decentered lenses in preparation for the lens fabrication process

Reading Assignment: System for Ophthalmic Dispensing, 3rd edition, Chapter 2

Optical Formulas, Section V – Lens and Frame Measurements, pgs. 137 – 140


Essentials of Ophthalmic Lens Finishing, 2nd edition Ch. 7, Blocking of Lenses

Week 6 – Topic: Lens Fabrication of Single Vision Lenses, Introduction to Diamond Hand Stone for hand beveling and applying safety bevel, Use of Heat Pan and Hot air blower

- Edger setting for frame size and edging
- Edger calibration of 36.5 mm and Set Numbers
- Lens Fabrication
- Diamond Stone and hand beveling and safety bevel
- Insertion of lenses into frame

Reading Assignment: System for Ophthalmic Dispensing, 3rd edition, Ch. 24 as it pertains to single vision lenses only. pgs. 593 – 595, pgs. 605-606
Chapter 7, Insertion of Lenses into plastic frames, System for Ophthalmic Dispensing, 3rd edition, pgs. 120-126.
Chapter 3, Essentials of Ophthalmic Lens Finishing, 2nd edition
Chapter 8, Edging, Essentials of Ophthalmic Lens Finishing, 2nd edition
Chapter 10, Hand Edging, Essentials of Ophthalmic Lens Finishing, 2nd edition
Week 7 – Topic: Prescription Verification, Basic Bench Alignment and introduce ANSI Z80.1 regarding industry standards as it relates to ophthalmic prescriptions

- Basic Bench alignment
- Prescription verification using Lensometer
- Does completed fabrication meet ANSI Z80.1 industry standards?
- Instructor will evaluate lens job for prescription verification, PD accuracy, standard bench alignment, bevel and safety bevel accuracy design


Chapter 12, Lens Insertion and Standard Alignment, Essentials of Ophthalmic Lens Finishing, 2nd edition

Week 8 – Exam II and Topic: Beginning Lens Fabrication Projects

Week 9 - 13 – Topic: Lens Fabrication Projects and Introduction to Lens Clock for Base Curve Determination

- Process additional single vision jobs and at the same time, improve on speed and accuracy. The instructor will examine, evaluate and monitor the student’s progress. Each project will be graded and count toward the students final grade

- Students will clock base curves on both unfinished and finished lenses to determine base curve and cross curves of both plus and minus cylinder lenses, plus and minus sphere lenses and finished fabrication projects turned in by the students as projects.

- Reading Assignment: System for Ophthalmic Dispensing, 3rd edition, pg. 308.

Week 14 –Final Exam and Completion of Lens Fabrication Projects

Week 15 – Final Lab Practical - Students will be required to neutralize a finished pair of eyeglasses, verify the base curve, and dot up the PD. The student will then have to fabricate a complete pair of eyeglasses that will be graded based on the instructor’s job ticket. Grading will consist of accuracy of prescription verification, cylinder axis, PD, bench alignment and ANZI Z80.1 standards.