GURU KASHI UNIVERSITY

B.VOC. in Optometry

Session 2025-26

Faculty of Health and Allied Sciences

Graduates Attributes

The programme B.VOC. in Optometry equips students with comprehensive knowledge and practical skills to perform essential patient care procedures related to vision and eye health. Graduates develop strong clinical competence in eye examinations, refraction, contact lens fitting, and detection of ocular disorders, along with effective communication, ethical practice, and problem-solving abilities. They are prepared to contribute to preventive and corrective eye care, ensuring quality service delivery in both clinical and community healthcare settings.

Programme Learning Outcomes: After Completion Of this Course Gradates will able to:

- Perform comprehensive eye examinations to assess visual acuity, refraction, and binocular vision effectively.
- Identify and manage common ocular conditions and recognize cases requiring referral to ophthalmologists.
- Demonstrate proficiency in fitting and prescribing corrective lenses and contact lenses tailored to individual patient needs.
- Apply principles of optics and ocular anatomy in clinical practice to deliver evidence-based eye care.
- Exhibit professional ethics, communication skills, and patient-centered care while working in clinical, community, and hospital settings.

Programme Structure

Semester 1st										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO101	General Anatomy & Physiology	Core Based	2	0	0	2	15	35	50
2	BVO102	Physical & Geometrical Optics – I	Core Based	2	0	0	2	15	35	50
3	BVO103	Introduction to Optometry & Eye Care	Core Based	2	0	0	2	15	35	50
4	BVO104	General Biochemistry	Core Based	2	0	0	2	15	35	50
5	BVO105	Entrepreneurship Setup & Lauch	Skill Based	0	0	4	2	15	35	50
6	BVO106	General Anatomy & Physiology Practical	Skill Based	0	0	4	2	15	35	50
7	BVO107	Physical & Geometrical Optics – I Practical	Skill Based	0	0	4	2	15	35	50
8	BVO108	Introduction to Optometry & Eye Care Practical	Skill Based	0	0	4	2	15	35	50
9	BVO109	General Biochemistry Practical	Skill Based	0	0	4	2	15	35	50
10	BVO110	Communication and Soft Skills	Compulsory Foundation	2	0	0	2	15	35	50

11	BVO111	Human Rights and Duties	Multi-Disciplinary	3	0	0	3	25	50	75
Total				**13**	**0**	**20**	**23**	**175**	**400**	**575**

Semester 2nd										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO201	Ocular Anatomy & Physiology	Core Based	2	0	0	2	15	35	50
2	BVO202	Physical & Geometrical Optics – II	Core Based	2	0	0	2	15	35	50
3	BVO203	Visual Optics – I	Core Based	2	0	0	2	15	35	50
4	BVO204	Basic Microbiology & Pathology	Core Based	2	0	0	2	15	35	50
5	BVO205	General Pharmacology	Core Based	2	0	0	2	15	35	50
6	BVO206	Ocular Anatomy & Physiology Practical	Skill Based	0	0	4	2	15	35	50
7	BVO207	Physical & Geometrical Optics – II Practical	Skill Based	0	0	4	2	15	35	50
8	BVO208	Visual Optics – I Practical	Skill Based	0	0	4	2	15	35	50
9	BVO209	Basic Microbiology & Pathology Practical	Skill Based	0	0	4	2	15	35	50
10	BVO210	General Pharmacology Practical	Skill Based	0	0	4	2	15	35	50
11	BVO211	Environmental Sciences	Compulsory Foundation	2	0	0	2	15	35	50
12	BVO212	First Aid	Value Added Courses	2	0	0	2	15	35	50

Total	**14**	**0**	**20**	**24**	**180**	**420**	**600**

Semester 3rd										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO301	Visual Optics – II	Core Based	2	0	0	2	15	35	50
2	BVO302	Clinical Examination of Visual System – I	Core Based	2	0	0	2	15	35	50
3	BVO303	Optometric Instruments & Dispensing – I	Core Based	2	0	0	2	15	35	50
4	BVO304	Ocular Diseases – I	Core Based	2	0	0	2	15	35	50
5	BVO305	Ophthalmic Optics – I	Core Based	2	0	0	2	15	35	50
6	BVO306	Visual Optics – II Practical	Skill Based	0	0	4	2	15	35	50
7	BVO307	Clinical Examination of Visual System – I Practical	Skill Based	0	0	4	2	15	35	50
8	BVO308	Optometric Instruments & Dispensing – I Practical	Skill Based	0	0	4	2	15	35	50
9	BVO309	Ocular Diseases – I Practical	Skill Based	0	0	4	2	15	35	50
10	BVO310	Ophthalmic Optics – I Practical	Skill Based	0	0	4	2	15	35	50
11	BVO311	Community Health & Primary Care	Compulsory Foundation	3	0	0	3	25	50	75
Total				**13**	**0**	**20**	**23**	**175**	**400**	**575**

Semester 4th										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO401	Clinical Examination of Visual System – II	Core Based	2	0	0	2	15	35	50
2	BVO402	Optometric Instruments & Dispensing – II	Core Based	2	0	0	2	15	35	50
3	BVO403	Ocular Diseases – II	Core Based	2	0	0	2	15	35	50
4	BVO404	Ophthalmic Optics – II	Core Based	2	0	0	2	15	35	50
5	BVO405	Contact Lens – I	Core Based	2	0	0	2	15	35	50
6	BVO406	Pediatric & Binocular Vision Optometry	Core Based	2	0	0	2	15	35	50
7	BVO407	Clinical Examination of Visual System – II Practical	Skill Based	0	0	4	2	15	35	50
8	BVO408	Optometric Instruments & Dispensing – II Practical	Skill Based	0	0	4	2	15	35	50
9	BVO409	Ocular Diseases – II Practical	Skill Based	0	0	4	2	15	35	50
10	BVO410	Ophthalmic Optics – II Practical	Skill Based	0	0	4	2	15	35	50
11	BVO411	Contact Lens – I Practical	Skill Based	0	0	4	2	15	35	50
12	BVO412	Pediatric & Binocular Vision Optometry Practical	Skill Based	0	0	4	2	15	35	50

Total	**12**	**0**	**24**	**24**	**180**	**420**	**600**

Semester 5th										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO501	Contact Lens – II	Core Based	2	0	0	2	15	35	50
2	BVO502	Low Vision & Rehabilitation	Core Based	2	0	0	2	15	35	50
3	BVO503	Ocular Pharmacology & Therapeutics	Core Based	2	0	0	2	15	35	50
4	BVO504	Community Optometry & Public Health	Core Based	2	0	0	2	15	35	50
5	BVO505	Medical Ethics & Legal Issues	Multidisciplinary	3	0	0	3	25	50	75
6	BVO506	Research Methodology & Biostatistics	Core Based	2	0	0	2	15	35	50
7	BVO507	Contact Lens – II Practical	Skill Based	0	0	4	2	15	35	50
8	BVO508	Low Vision & Rehabilitation Practical	Skill Based	0	0	4	2	15	35	50
9	BVO509	Ocular Pharmacology & Therapeutics Practical	Skill Based	0	0	4	2	15	35	50
10	BVO510	Community Optometry & Public Health Practical	Skill Based	0	0	4	2	15	35	50
11	BVO511	Research Methodology & Biostatistics Practical	Skill Based	0	0	4	2	15	35	50
Total				**13**	**0**	**20**	**23**	**175**	**400**	**575**

Semester 6th										
S. No.	**Course Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Cr.**	**Int**	**Ext**	**Total Marks**
1	BVO601	Internship	Skill Based	0	0	40	20	150	350	500
Total				**0**	**0**	**40**	**20**	**150**	**350**	**500**
Grand Total				**65**	**0**	**144**	**137**	**1035**	**2390**	**3425**

Semester 1st

Course Title: General Anatomy & Physiology	L	T	P	Cr
Course Code: BVO101	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the structural organization of the human body from cell to organ system.
2. Describe the normal anatomy and physiology of major organ systems.
3. Correlate structure with function in maintaining homeostasis.
4. Apply knowledge of anatomy and physiology in understanding common clinical conditions.

Course Contents

UNIT I: Introduction to Anatomy & Physiology (10 Hours)

- Definition and scope of anatomy and physiology
- Levels of structural organization: cell, tissue, organ, system
- Anatomical terminology: planes, positions, and movements
- Homeostasis and feedback mechanisms

UNIT II: Skeletal & Muscular System (10 Hours)

- Overview of bones: classification, structure, growth
- Joints: types and movements
- Muscular system: types of muscles, structure, physiology of muscle contraction
- Skeletal landmarks of major bones

UNIT III: Circulatory & Respiratory System (5 Hours)

- Blood: composition, functions, and blood groups
- Heart: anatomy, cardiac cycle, blood circulation

- Respiratory system: structure of respiratory tract and physiology of respiration

UNIT IV: Digestive, Nervous & Excretory System (5 Hours)

- Digestive system: organs and process of digestion & absorption
- Nervous system: central and peripheral overview, neurons and synapses
- Excretory system: kidney structure, nephron, urine formation

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based discussions, Question–Answer sessions

Suggested Readings

- *TORTORA GJ, DERRICKSON BH. Principles of Anatomy and Physiology. 15th ed. Hoboken: Wiley; 2017.*
- *MARIEB EN, HOEHN K. Human Anatomy & Physiology. 11th ed. New York: Pearson; 2019.*
- *ROSS MH, PAWLINA W. Histology: A Text and Atlas. 7th ed. Philadelphia: Wolters Kluwer; 2015.*
- *GUYTON AC, HALL JE. Textbook of Medical Physiology. 14th ed. Philadelphia: Elsevier; 2020.*
- *DATTA AK. Essentials of Human Anatomy (Regional). 10th ed. Kolkata: Current Books; 2021.*

Course Title: Physical & Geometrical Optics – I	L	T	P	Cr
Course Code: BVO102	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain fundamental principles of light propagation and optical phenomena.
2. Differentiate between geometrical and physical aspects of optics.
3. Apply laws of reflection and refraction in image formation.
4. Understand interference, diffraction, and polarization phenomena.
5. Relate theoretical concepts of optics to optical instruments and vision science.

Course Contents

UNIT I: Nature of Light & Reflection (10 Hours)

- Nature of light: particle theory vs wave theory, electromagnetic spectrum
- Velocity of light, refractive index, optical path
- Laws of reflection, reflection from plane and spherical mirrors
- Formation of images by mirrors, mirror formula and magnification

UNIT II: Refraction & Lenses (10 Hours)

- Laws of refraction, Snell's law, total internal reflection and critical angle
- Refraction at plane surfaces: apparent depth, real and apparent shift
- Refraction through spherical surfaces: lens maker's formula
- Types of lenses, cardinal points, image formation by lenses
- Combination of lenses and lens defects (aberrations – spherical and chromatic)

UNIT III: Interference of Light (5 Hours)

- Principle of superposition
- Conditions for constructive and destructive interference
- Young's double-slit experiment
- Thin film interference (colours of soap bubble, wedge-shaped film)

UNIT IV: Diffraction & Polarization (5 Hours)

- Fresnel and Fraunhofer diffraction (single slit)
- Resolving power of optical instruments
- Polarization: definition, methods of production (polarizer, analyzer, Nicol prism)
- Applications of polarized light

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based discussions, Question–Answer sessions

Suggested Readings

- *HECHT E. Optics. 5th ed. New York: Pearson; 2017.*
- *JENKINS FA, WHITE HE. Fundamentals of Optics. 4th ed. New Delhi: McGraw Hill; 2017.*
- *BRILLUOIN L. Wave Propagation and Group Velocity. New York: Academic Press; 1960.*
- *GHATAK A. Optics. 6th ed. New Delhi: McGraw Hill Education; 2017.*
- *SATYAPRAKASH. Optics. Meerut: Pragati Prakashan; 2021.*

Course Title: Introduction to Optometry & Eye Care	L	T	P	Cr
Course Code: BVO103	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Define optometry and describe its role in the healthcare system.
2. Explain the basic structure and function of the human eye.
3. Identify common refractive errors and ocular conditions.
4. Understand fundamentals of primary eye care and vision screening.
5. Appreciate the professional and ethical responsibilities of an optometrist.

Course Contents

UNIT I: Introduction to Optometry (10 Hours)

- Definition, scope, and history of optometry
- Role of optometrists in primary, secondary, and tertiary care
- Overview of eye care team: ophthalmologist, optometrist, optician
- Ethical and professional standards in optometry practice

UNIT II: Anatomy & Physiology of the Eye (10 Hours)

- Structure and functions of the eye: cornea, lens, retina, optic nerve
- Accessory structures: eyelids, conjunctiva, lacrimal apparatus, extraocular muscles
- Basic concepts of vision: image formation and visual pathway
- Physiology of accommodation and binocular vision

UNIT III: Common Ocular Conditions & Refractive Errors (5 Hours)

- Myopia, hypermetropia, astigmatism, presbyopia
- Common eye diseases: conjunctivitis, dry eye, cataract, glaucoma
- Basics of ocular emergencies (foreign body, trauma, chemical injury)

UNIT IV: Introduction to Eye Care Services (5 Hours)

- Vision screening in community and school settings
- Introduction to optical devices: spectacles, contact lenses, low vision aids
- Eye hygiene, preventive eye care, and public health aspects

- Future prospects and recent advances in optometry

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based discussions, Question–Answer sessions

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 8th ed. New Delhi: Jaypee Brothers Medical Publishers; 2022.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.*
- *REMINGTON LA. Clinical Anatomy and Physiology of the Visual System. 4th ed. St. Louis: Elsevier; 2021.*
- *ELLIS FJ, SWANSON MW. Introduction to Primary Care Optometry. 2nd ed. St. Louis: Mosby; 2019.*
- *WHITCHER JP, SRINIVASAN M, UPADHYAY MP. Corneal Blindness: A Global Perspective. Bull World Health Organ. 2001;79(3):214-21.*

Course Title: General Biochemistry	L	T	P	Cr
Course Code: BVO104	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the structure and function of biomolecules essential for life.
2. Understand the biochemical basis of metabolism and energy production.
3. Correlate biochemical processes with physiological functions.
4. Apply biochemical concepts to health, disease, and eye care.

Course Contents

UNIT I: Introduction & Biomolecules – I (10 Hours)

- Introduction to biochemistry: scope and relevance in health sciences
- Carbohydrates: classification, structure, functions
- Lipids: classification, structure, functions
- Clinical significance of carbohydrates and lipids

UNIT II: Biomolecules – II (10 Hours)

- Proteins: classification, structure (primary to quaternary), functions
- Nucleic acids: DNA, RNA – structure and function
- Enzymes: properties, classification, mechanism of enzyme action
- Factors affecting enzyme activity, enzyme inhibition

UNIT III: Bioenergetics & Metabolism – I (5 Hours)

- ATP as energy currency
- Overview of carbohydrate metabolism: glycolysis, Krebs cycle
- Oxidative phosphorylation and electron transport chain

UNIT IV: Metabolism – II & Clinical Aspects (5 Hours)

- Lipid metabolism: β-oxidation, synthesis of fatty acids
- Protein metabolism: transamination, deamination, urea cycle
- Clinical correlations: diabetes, jaundice, metabolic disorders
- Basic biochemical tests in clinical practice

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based discussions, Question–Answer sessions

Suggested Readings

- HARPER HA, RODWELL VW, BENDER DA. Harper's Illustrated Biochemistry. 32nd ed. New York: McGraw-Hill; 2021.
- NELSON DL, COX MM. Lehninger Principles of Biochemistry. 8th ed. New York: W.H. Freeman; 2021.
- SATYANARAYANA U, CHAKRAPANI U. Biochemistry. 5th ed. Hyderabad: Elsevier India; 2021.
- DEWAN K. Essentials of Biochemistry. 2nd ed. New Delhi: Jaypee Brothers Medical Publishers; 2019.
- DEVLIN TM. Textbook of Biochemistry with Clinical Correlations. 8th ed. Hoboken: Wiley; 2010.

Course Title: Entrepreneurship Setup & Lauch	L	T	P	Cr.
Course Code: BMD105	0	0	4	2

Introduction: This semester lays the foundation for the learner to understand what entrepreneurship is, beyond just starting a business. It introduces key ideas like problem-solving, value creation, and self-awareness. The learner will begin exploring basic business concepts while discovering their own interests and strengths.

Learners Objective: After Completion of this course, the learner will be able to:

1. Understand the core concepts of entrepreneurship through relatable, real-life examples.
2. Begin to see themselves as problem-solvers and creators.
3. Learn about business paths and choose one to try based on interest or local fit.
4. Launch a micro-hustle (online or offline) to earn their first income.
5. Build confidence and self-belief by doing.

Outcome: By the end of this semester, learners will start a simple business activity, earn their first income, and build belief in their ability to do business.

Guiding Principles/Approach: This syllabus is built on principles of experiential learning, growth mindset development, and identity-first learning. Drawing from learning science and behavior design, the course shifts students from passive learning to active doing, where they try out small business activities in real contexts. The design helps students not just learn entrepreneurship, but begin to see themselves as entrepreneurs. Emphasis is placed on small wins, peer collaboration, and locally relevant opportunities to ensure learning feels achievable and connected to their realities. The curriculum focuses on conceptual understanding without heavy theory, combining

practical action, reflection, and collaboration. By making progress visible and success feel possible, it plants the seeds of self-reliance, initiative, and long-term motivation.

Semester Syllabus:

Format: 12 weeks, 4 hours/week | 2 credits

Revenue Target: ₹10,000

Week	Learning Goal	Measurable Outcome
1	Understand what entrepreneurship is and who can be an entrepreneur	Students define entrepreneurship in their own words and list 2 entrepreneurs from their local area or community
2	Connect personal identity to entrepreneurship (strengths, interests, struggles)	Students create a "value map" showing how a skill/interest/problem from their life could become a business opportunity
3	Learn about 5 business paths: content creation, dropshipping, cloud kitchen/food business, gig economy and local services	Students explore 1–2 examples from each domain and share one they're most curious to try and why
4	Choose a path and generate a basic business idea	Students write down a clear offer (what, for whom, why) and one way to reach their customer
5	Take first real action: message, post, pitch, or sell	Students reach out to or serve 1 real potential customer and record what happened
6	Reflect on first attempt and share with peers	Students share their result, a challenge faced, and one idea to improve next time

7	Improve and try again: aim for first ₹100	Students apply a change, try again, and aim to make their first ₹100 or get meaningful response
8	Learn how to identify and understand your target customer	Students talk to 2 potential customers or observe them and list 3 insights about their needs
9	Learn how to serve your target audience better	Students improve one part of their offer (product, delivery, messaging, or interaction) based on customer feedback or need
10	Explore core entrepreneurial values (resilience, honesty, effort)	Students reflect on 1 value they're building and show it in a business task or peer story
11	Focus on earning and staying consistent	Students complete a second earning task and track their consistency (e.g., same product or message for 3 days)
12	Reflect on earnings, grit, and how to keep going	Students record total earnings, one resilience moment, and one support system or habit they'll continue with

Weekly Component:

Component	Duration	Description
Learning Module	~1.5 hrs	• Introduces key concepts in a simple and engaging way • Includes, examples, and 1–2 interactive discussions or quizzes

Action Lab	~2 hrs	• Hands-on task on the weekly concept • Includes step-by-step guidance, templates, and worksheets • Ends with a submission (e.g., video, reflection, or proof of action)
Resources	Self-paced	• Supplementary videos, short readings, real- life stories, and tools to deepen understanding at their own pace

Evaluation Criteria

Evaluation Component	**Description**	**Weightage**
Weekly Task Completion	Timely submission of weekly tasks including reflections, activities, quizzes etc.	40%
Target Completion	Performance-based evaluation on hitting **revenue or profit targets** (e.g., generating ₹10,000 revenue)	30%
Final Project	A comprehensive project based on the semester's theme	30%

Course Title: General Anatomy & Physiology Practical	L	T	P	Cr.
Course Code: BVO106	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify and describe the basic anatomical structures of the human body.
2. Demonstrate the use of laboratory tools and techniques for anatomical and physiological study.
3. Perform practical experiments related to various systems of the body.
4. Correlate anatomical structures with their physiological functions.
5. Record, analyze, and interpret basic physiological parameters.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to laboratory safety, instruments, and handling of specimens.
- Study of human skeleton (axial and appendicular).
- Identification of bones and their features (long bones, flat bones, irregular bones).
- Demonstration of articulated skeleton and joints.
- Study of histological slides – epithelial tissues.
- Study of histological slides – connective tissues.
- Study of histological slides – muscular tissue.
- Study of histological slides – nervous tissue.
- Demonstration of circulatory system (heart and major vessels).
- Recording of pulse and blood pressure.
- Hemoglobin estimation (Sahli's method).
- Total leukocyte count (TLC) and Differential leukocyte count (DLC).
- Determination of blood group and Rh factor.
- Measurement of respiratory rate and vital capacity.
- Demonstration of digestive system models.

- Identification of endocrine glands using models/charts.
- Study of urinary system using models.
- Examination of urine for normal and abnormal constituents.
- Reflex testing and demonstration of sensory system.
- Study of reproductive system models and charts.

Suggested Readings

- *TORTORA GJ, DERRICKSON B. Principles of Anatomy and Physiology. 16th ed. Wiley; 2020.*
- *MARIEB EN, HOEHN K. Human Anatomy & Physiology. 11th ed. Pearson; 2018.*
- *CHAITOW L, WALKER B. Clinical Anatomy and Physiology for Healthcare Professionals. 3rd ed. Elsevier; 2016.*
- *ROSS MH, PAWLINA W. Histology: A Text and Atlas. 8th ed. Wolters Kluwer; 2020.*
- *HALL JE. Guyton and Hall Textbook of Medical Physiology. 14th ed. Elsevier; 2020.*
- *INDERBIR SINGH. Textbook of Anatomy with Colour Atlas. 6th ed. Jaypee Brothers; 2019.*
- *SINGH I. Textbook of Human Histology. 8th ed. Jaypee Brothers; 2021.*

Course Title: Physical & Geometrical Optics – I Practical	L	T	P	Cr.
Course Code: BVO107	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate basic experimental skills in physical and geometrical optics.
2. Verify fundamental laws of reflection, refraction, and optical imaging.
3. Determine focal lengths and radii of curvature of different lenses and mirrors.
4. Apply optical principles to practical experiments such as dispersion, interference, and diffraction.
5. Record, analyze, and interpret experimental results with accuracy.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to laboratory instruments, safety, and error analysis in optics.
- Verification of laws of reflection using a plane mirror.
- Verification of laws of refraction using a glass slab (Snell's law).
- Determination of refractive index of a glass prism by minimum deviation method.
- Determination of focal length of a convex lens by displacement method.
- Determination of focal length of a concave mirror by u-v method.
- Determination of focal length of a convex mirror using auxiliary lens.
- Measurement of radius of curvature of a spherical surface using a spherometer.
- Study of combination of two thin lenses (in contact and separated).
- Verification of lens maker's formula.
- Determination of dispersive power of a prism.
- Determination of resolving power of a telescope.

- Study of interference fringes using a biprism (Fresnel's biprism experiment).
- Determination of wavelength of light using Newton's rings method.
- Measurement of thickness of a thin glass plate using interference method.
- Verification of Malus's law of polarization.
- Study of diffraction of light by single slit.
- Determination of wavelength of light using diffraction grating.
- Construction and adjustment of a spectrometer.
- Demonstration of optical instruments: simple microscope, compound microscope, and telescope.

Suggested Readings

- *HECHT E. Optics. 5th ed. Pearson; 2016.*
- *JENKINS FA, WHITE HE. Fundamentals of Optics. 4th ed. McGraw-Hill; 2017.*
- *BRILLOUIN L. Physical Principles of Optics. Academic Press; 2013.*
- *GUPTA BR. Textbook of Optics. 4th ed. S. Chand; 2017.*
- *KHANNA DR, GULATI BM. A Textbook of Optics. 25th ed. S. Chand; 2019.*
- *SINGH AV. Practical Physics. 2nd ed. Pragati Prakashan; 2018.*
- *BOYLE W, SMITH D. Experimental Physics: Principles and Practice. Springer; 2014.*

Course Title: Introduction to Optometry & Eye Care Practical	L	T	P	Cr.
Course Code: BVO108	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate basic skills in optometry and eye care laboratory practice.
2. Identify and handle common optometry instruments.
3. Perform preliminary eye examinations including visual acuity and ocular health assessment.
4. Record patient case history in a structured manner.
5. Apply infection control and ethical practices in clinical eye care.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to the optometry lab – safety measures, hygiene, and handling of instruments.
- Familiarization with common optometry equipment (trial set, retinoscope, ophthalmoscope, slit lamp, keratometer, autorefractor, tonometer).
- Measurement of visual acuity using Snellen's chart and LogMAR chart.
- Recording of case history and patient data (structured format).
- Pupillary reflex testing (direct, consensual, and near reflex).
- Color vision testing using Ishihara charts.
- Amsler grid test for central visual field assessment.
- Measurement of interpupillary distance (IPD).
- Cover–uncover test and alternate cover test for heterophoria/heterotropia.
- Near point of convergence (NPC) and near point of accommodation (NPA).

- External examination of the eye – lids, lashes, conjunctiva, sclera, cornea.
- Torchlight examination of the anterior segment.
- Demonstration of slit-lamp biomicroscopy.
- Demonstration of direct ophthalmoscopy – visualization of optic disc and retina.
- Measurement of corneal curvature using keratometer.
- Introduction to retinoscopy – neutralization technique.
- Measurement of intraocular pressure using Schiotz tonometer.
- Introduction to contact lenses – types, handling, and care.
- Basics of dispensing optics – introduction to lenses, frames, and lensometry.
- Demonstration of low vision aids and their applications.

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers; 2019.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *GROSVENOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *ELLIS FJ, FIELD M. Clinical Skills in Optometry: A Practical Guide. Elsevier; 2013.*
- *PANDEY SK. Ophthalmology Clinics for Postgraduates. Jaypee Brothers; 2016.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2020.*
- *GHOSH A. Fundamentals of Optometry. PHI Learning; 2015.*

Course Title: General Biochemistry Practical	L	T	P	Cr.
Course Code: BVO109	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate familiarity with basic laboratory safety protocols and biochemistry instruments.
2. Prepare and handle biological samples for biochemical analysis.
3. Perform qualitative and quantitative tests for biomolecules (carbohydrates, proteins, lipids).
4. Analyze enzyme activity and physiological metabolites.
5. Record, interpret, and present biochemical experimental results accurately.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to biochemistry laboratory – safety, glassware handling, and preparation of solutions.
- Preparation of buffers and measurement of pH.
- Qualitative tests for carbohydrates: Molisch's, Benedict's, Barfoed's, Iodine, Seliwanoff's.
- Quantitative estimation of glucose by colorimetric method (DNS/anthrone method).
- Qualitative tests for proteins: Biuret, Millon's, Xanthoproteic, Ninhydrin.
- Quantitative estimation of proteins (Lowry's method / Biuret method).
- Precipitation reactions of proteins – heat coagulation, salt saturation.
- Qualitative tests for lipids: Sudan III, solubility, saponification.
- Estimation of serum cholesterol (colorimetric method).
- Detection of abnormal constituents in urine: glucose, ketone bodies, proteins, bile salts, bile pigments.

- Estimation of hemoglobin (Sahli's method).
- Enzyme activity assay – effect of temperature and pH on salivary amylase activity.
- Determination of enzyme kinetics (Michaelis–Menten curve – demonstration).
- Paper chromatography of amino acids (ascending technique).
- Separation of sugars using thin-layer chromatography (TLC).
- Demonstration of electrophoresis technique (serum proteins).
- Osmosis and diffusion experiments.
- Estimation of urea in serum/urine.
- Demonstration of bilirubin estimation.
- Case-based demonstration of clinical biochemistry applications (diabetes, liver function tests, renal function tests).

Suggested Readings

- SATYANARAYANA U, CHAKRAPANI U. Biochemistry. 5th ed. Elsevier; 2021.
- VASUDEVAN DM, SREEKUMARI S, VYSHALI V. Textbook of Biochemistry for Medical Students. 9th ed. Jaypee Brothers; 2023.
- DEWICK PM. Practical Biochemistry. 3rd ed. Wiley; 2018.
- PLUMMER DT. An Introduction to Practical Biochemistry. 3rd ed. McGraw-Hill; 2010.
- NELSON DL, COX MM. Lehninger Principles of Biochemistry. 8th ed. W.H. Freeman; 2021.
- MURRAY RK, BENDER DA, BOTHAM KM, KENNELLY PJ, RODWELL VW, WEIL PA. Harper's Illustrated Biochemistry. 32nd ed. McGraw-Hill; 2022.
- DAMODARAN S, PARKIN KL, FENNEMA OR. Fennema's Food Chemistry. 5th ed. CRC Press; 2017.

Course Title: Communication and Soft Skills	L	T	P	Cr
Course Code: BVO110	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the fundamentals of verbal and non-verbal communication.
2. Develop effective listening, speaking, reading, and writing skills.
3. Demonstrate confidence in interpersonal communication and public speaking.
4. Apply soft skills such as teamwork, leadership, and time management in professional settings.
5. Practice effective communication strategies in academic, clinical, and workplace contexts.

Course Contents

UNIT I: Fundamentals of Communication (10 Hours)

- Definition, process, and importance of communication
- Types of communication: verbal, non-verbal, written, visual
- Barriers to communication and strategies to overcome them
- Role of communication in healthcare and professional practice

UNIT II: Language and Interpersonal Skills (10 Hours)

- Listening skills – active listening and barriers
- Speaking skills – articulation, fluency, tone, and clarity
- Non-verbal communication – body language, gestures, eye contact, posture
- Interpersonal skills – empathy, assertiveness, cultural sensitivity

UNIT III: Professional & Academic Communication (5 Hours)

- Oral presentations – structure, delivery, and use of audiovisual aids
- Group discussions and debates
- Interview skills – preparation, do's and don'ts
- Writing skills – emails, reports, memos, and formal letters

UNIT IV: Soft Skills Development (5 Hours)

- Time management and goal setting
- Teamwork and collaboration
- Conflict resolution and negotiation skills
- Leadership and problem-solving skills

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- KAUL A. Business Communication. 2nd ed. Prentice Hall India; 2017.
- MURPHY H, HILDEBRANDT H, THOMAS J. Effective Business Communication. 7th ed. McGraw-Hill; 2019.
- LESIKAR RV, FLATLEY ME, RENTZ K, LATTUCA LR. Business Communication: Making Connections in a Digital World. 12th ed. McGraw-Hill; 2020.
- SEN L. Communication Skills. Prentice Hall India; 2016.
- GUFFEY ME, LOEWY D. Essentials of Business Communication. 11th ed. Cengage Learning; 2021.
- SOFT SKILLS TRAINING: A Workbook to Develop Skills for Employment. ILO Publications; 2013.
- KURIAN A. Soft Skills for Healthcare Professionals. Jaypee Brothers; 2018.

Course Title: Human Rights and Duties	L	T	P	Cr
Course Code: BVO111	3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the concept, scope, and importance of human rights in personal and professional contexts.
2. Understand constitutional provisions, legal frameworks, and international conventions on human rights.
3. Recognize the duties and responsibilities of citizens in a democratic society.
4. Apply principles of equality, justice, and human dignity in healthcare and community services.

Course Contents

UNIT–I: Introduction to Human Rights (15 Hours)

- Concept, meaning, and evolution of human rights
- Classification of rights: civil, political, economic, social, cultural, environmental
- Universal Declaration of Human Rights (UDHR) – significance and articles
- Human rights in Indian context

UNIT–II: Human Rights and the Indian Constitution (10 Hours)

- Fundamental Rights and Fundamental Duties
- Directive Principles of State Policy (DPSP)
- Role of judiciary in protection of human rights
- National and State Human Rights Commissions

UNIT–III: Human Rights in Practice (10 Hours)

- Human rights and vulnerable groups: women, children, elderly, differently-abled, minorities

- Rights of healthcare and frontline workers
- Human rights violations: causes, issues, and remedies
- Role of NGOs, civil society, and media in promoting human rights

UNIT–IV: Duties and Responsibilities of Citizens (10 Hours)

- Concept and importance of duties
- Civic responsibilities and social obligations
- Environmental protection and sustainable development as a duty
- Ethical issues and professional duties in healthcare

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *BASU DD. Introduction to the Constitution of India. Lexis Nexis.*
- *JAGMOHAN R. Human Rights in India: Historical, Social and Political Perspectives. Oxford University Press.*
- *DESAI A, PATEL S. Human Rights Law and Practice. Universal Law Publishing.*
- *SHARMA SK. Human Rights in the 21st Century. APH Publishing.*
- *United Nations. Universal Declaration of Human Rights (UDHR) – UN Document.*

Semester 2nd

Course Title: Ocular Anatomy & Physiology	L	T	P	Cr
Course Code: BVO201	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the gross anatomy of the eyeball, adnexa, and visual pathways.
2. Explain the physiology of various ocular structures.
3. Understand the functional mechanisms involved in vision (accommodation, refraction, adaptation).
4. Relate anatomical and physiological knowledge to common ocular disorders.

Course Contents

UNIT–I: Anatomy of the Eye (10 Hours)

- Gross anatomy of the eyeball
- Layers of the eye: sclera, cornea, choroid, retina
- Anatomy of ocular adnexa: eyelids, conjunctiva, lacrimal apparatus
- Extraocular muscles and their nerve supply

UNIT–II: Physiology of the Eye (10 Hours)

- Physiology of cornea and lens (transparency, nourishment, accommodation)
- Aqueous humor: formation, circulation, drainage, intraocular pressure
- Physiology of retina and photoreceptors
- Physiology of lacrimal secretion and tear film

UNIT–III: Visual Physiology (5 Hours)

- Image formation and visual acuity
- Light and dark adaptation
- Color vision and theories
- Visual field and common defects

UNIT–IV: Neuro-ophthalmology Basics (5 Hours)

- Visual pathway and its lesions
- Pupillary reflexes (light and accommodation reflex)
- Oculomotor system and eye movements
- Higher visual functions (binocular vision, stereopsis)

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- KHUFFMAN J. Clinical Ocular Anatomy and Physiology. Wolters Kluwer.
- KHURANA AK. Anatomy and Physiology of Eye. CBS Publishers.
- SNELL RS. Clinical Anatomy of the Eye. Wiley-Blackwell.
- GANONG WF. Review of Medical Physiology. McGraw Hill.
- RIORDAN-EVA P, WHITCHER JP. Vaughan & Asbury's General Ophthalmology. McGraw Hill.

Course Title: Physical & Geometrical Optics – II	L	T	P	Cr
Course Code: BVO202	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles of physical optics including interference, diffraction, and polarization.
2. Apply geometrical optics in understanding lens systems and optical instruments.
3. Describe the optical properties of the human eye and related applications in optometry.
4. Solve problems related to refraction, reflection, and image formation.

Course Contents

UNIT–I: Interference of Light (10 Hours)

- Principle of superposition of waves
- Young's double-slit experiment
- Interference in thin films (colors of soap bubbles, anti-reflection coatings)
- Applications in ophthalmic optics

UNIT–II: Diffraction and Polarization (10 Hours)

- Fresnel and Fraunhofer diffraction
- Single-slit and double-slit diffraction patterns
- Resolving power of optical instruments (microscopes, telescopes)
- Polarization: plane, circular, elliptical; applications in ophthalmology (polarized lenses, corneal birefringence)

UNIT–III: Geometrical Optics Applications (5 Hours)

- Refraction through lenses and prisms
- Cardinal points of optical systems
- Magnification and optical aberrations
- Introduction to optical instruments (magnifiers, microscopes, telescopes)

UNIT–IV: Optics of the Eye (5 Hours)

- Reduced eye and schematic eye models
- Refractive indices of ocular media
- Concept of visual angle and retinal image formation
- Introduction to ametropia and its correction

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *HECHT E. Optics. Addison-Wesley.*
- *KHURANA AK. Theory and Practice of Optics & Refraction. CBS Publishers.*
- *JENKINS FA, WHITE HE. Fundamentals of Optics. McGraw Hill.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. Elsevier.*
- *CHARMAN WN. Vision and Visual Function.*

Course Title: Visual Optics – I	L	T	P	Cr
Course Code: BVO203	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the basic optical properties of the eye and its components.
2. Understand the formation of retinal images using schematic and reduced eye models.
3. Apply concepts of visual angle, magnification, and refractive errors.
4. Analyze optical principles relevant to clinical optometry.

Course Contents

UNIT–I: Fundamentals of Visual Optics (10 Hours)

- Nature of light and principles of refraction in ocular media
- Reduced eye and schematic eye models (Listing's, Gullstrand's schematic eye)
- Refractive indices of ocular structures (cornea, aqueous, lens, vitreous)
- Concept of cardinal points of the eye

UNIT–II: Retinal Image Formation (10 Hours)

- Visual angle and retinal image size
- Factors influencing retinal image formation
- Pupillary size and depth of focus
- Stiles-Crawford effect and its significance

UNIT–III: Optical Errors of the Eye (5 Hours)

- Ametropia: myopia, hypermetropia, astigmatism, presbyopia
- Causes and classification of refractive errors
- Effects on visual acuity and retinal image quality

UNIT–IV: Accommodation and Related Phenomena (5 Hours)

- Mechanism of accommodation
- Near point, far point, amplitude of accommodation
- Convergence and accommodation relationship (AC/A ratio)
- Clinical significance in optometric practice

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *BORISH IM. Clinical Refraction. WB Saunders.*
- *KHUFFMAN J. Clinical Ocular Anatomy and Physiology. Wolters Kluwer.*
- *GROSVENOR T. Primary Care Optometry. Butterworth-Heinemann.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. Elsevier.*
- *DUKE-ELDER S. System of Ophthalmology, Volume V: Ophthalmic Optics and Refraction. Henry Kimpton.*

Course Title: Basic Microbiology & Pathology	L	T	P	Cr
Course Code: BVO204	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the basic structure, classification, and pathogenic role of microorganisms.
2. Understand host–pathogen interaction and principles of infection control.
3. Explain the fundamental concepts of general pathology, including cellular adaptations and inflammation.
4. Correlate microbiological and pathological principles with ocular and systemic diseases relevant to optometry.

Course Contents

UNIT–I: Fundamentals of Microbiology (10 Hours)

- Introduction, history, and scope of microbiology
- Classification and morphology of bacteria, viruses, fungi, and parasites
- Sterilization and disinfection methods
- Normal microbial flora of the human body

UNIT–II: Infection & Immunity (10 Hours)

- Sources and transmission of infection
- Pathogenesis of common microbial diseases
- Principles of host defense mechanisms (innate and adaptive immunity)
- Vaccines and their importance in preventive health

UNIT–III: General Pathology (5 Hours)

- Cellular injury and adaptations
- Inflammation: acute and chronic
- Tissue repair and wound healing
- Oedema, thrombosis, and embolism (basics)

UNIT–IV: Systemic and Ocular Relevance (5 Hours)

- Pathogenesis of common systemic infections (tuberculosis, syphilis, HIV, etc.)

- Ocular infections: conjunctivitis, keratitis, endophthalmitis (basic concepts)
- Laboratory diagnosis of microbial diseases (overview)
- Importance of microbiology and pathology in clinical optometry practice

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *ANANTHANARAYAN R, PANIKER CKJ. Textbook of Microbiology. Universities Press.*
- *PRESCOTT LM, HARLEY JP, KLEIN DA. Microbiology. McGraw Hill.*
- *ROBBINS SL, COTRAN RS, KUMAR V. Robbins Basic Pathology. Elsevier.*
- *TORTORA GJ, FUNKE BR, CASE CL. Microbiology: An Introduction. Pearson.*
- *PARIJA SC. Textbook of Microbiology and Immunology. Elsevier.*

Course Title: General Pharmacology	L	T	P	Cr
Course Code: BVO205	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the basic principles of pharmacology, including pharmacokinetics and pharmacodynamics.
2. Explain the mechanism of drug action and factors affecting drug response.
3. Classify major groups of drugs and their clinical applications.
4. Recognize adverse drug reactions, drug interactions, and their relevance in healthcare practice.
5. Correlate pharmacological principles with therapeutic use in ocular and systemic conditions.

Course Contents

UNIT–I: Introduction to Pharmacology & Pharmacokinetics (10 Hours)

- Definition, scope, and branches of pharmacology
- Routes of drug administration
- Absorption, distribution, metabolism, and excretion of drugs (ADME)
- Factors modifying drug action (age, sex, weight, genetic factors, disease states)

UNIT–II: Pharmacodynamics (10 Hours)

- Principles of drug action: receptors, agonists, antagonists
- Dose-response relationship, therapeutic index
- Mechanism of action of drugs
- Adverse drug reactions, drug toxicity, and drug interactions

UNIT–III: Autonomic Nervous System (ANS) Pharmacology (5 Hours)

- Overview of sympathetic and parasympathetic systems
- Drugs acting on adrenergic and cholinergic receptors
- Clinical applications of ANS drugs (including ocular relevance: mydriatics, miotics)

UNIT–IV: Basics of Chemotherapy & Special Topics (5 Hours)

- General principles of antimicrobial chemotherapy
- Antibiotics, antivirals, antifungals (basic concepts)
- Corticosteroids and anti-inflammatory drugs
- Introduction to commonly used ophthalmic drugs (overview)

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *TRIPATHI KD. Essentials of Medical Pharmacology. Jaypee Brothers.*
- *SHARMA HL, SHARMA KK. Principles of Pharmacology. Paras Publishers.*
- *GOODMAN & GILMAN. The Pharmacological Basis of Therapeutics. McGraw Hill.*
- *RANG HP, DALE MM, RITTER JM, FLOWER RJ. Pharmacology. Elsevier.*
- *MYcek MJ, Harvey RA, Champe PC. Lippincott's Illustrated Reviews: Pharmacology. Wolters Kluwer.*

Course Title: Ocular Anatomy & Physiology Practical	L	T	P	Cr.
Course Code: BVO206	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify the anatomical structures of the eye and adnexa using models, charts, and specimens.
2. Demonstrate practical understanding of the physiology of ocular functions.
3. Perform basic clinical assessments such as visual acuity, pupillary reactions, and ocular motility tests.
4. Correlate theoretical knowledge with practical skills essential for optometry practice.

Course Content / List of Practicals (60 Hours)

- Introduction to laboratory safety, handling of instruments, and use of ocular models.
- Identification of parts of the eyeball (gross anatomy) on charts, models, and specimens.
- Study of ocular adnexa: eyelids, conjunctiva, lacrimal apparatus.
- Identification and demonstration of extraocular muscles and their actions.
- Study of cornea, sclera, and uveal tract using diagrams and prepared slides.
- Observation of retina and optic nerve in anatomical charts/models.
- Practical demonstration of tear secretion and tear film evaluation (Schirmer's test, tear breakup time – demo).
- Measurement of visual acuity using Snellen's chart and near vision chart.
- Assessment of pupillary reflexes (direct and consensual light reflex, near reflex).
- Demonstration of ocular movements and interpretation of extraocular muscle actions.

- Study of accommodation and convergence responses.
- Case-based exercises: correlating anatomy and physiology with common ocular disorders.

Suggested Readings

- *KHUFFMAN J. Clinical Ocular Anatomy and Physiology. Wolters Kluwer.*
- *KHURANA AK. Anatomy and Physiology of Eye. CBS Publishers.*
- *SNELL RS. Clinical Anatomy of the Eye. Wiley-Blackwell.*
- *RIORDAN-EVA P, WHITCHER JP. Vaughan & Asbury's General Ophthalmology. McGraw Hill.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. Elsevier.*

Course Title: Physical & Geometrical Optics – II Practical	L	T	P	Cr.
Course Code: BVO207	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the principles of interference, diffraction, and polarization of light through experiments.
2. Apply geometrical optics concepts to study lenses, prisms, and optical instruments.
3. Perform experiments to determine resolving power, focal length, and aberrations in optical systems.
4. Relate theoretical concepts of physical and geometrical optics to clinical optometry practice.

Course Content

List of Practicals (60 Hours)

- Study of interference patterns using Young's double-slit experiment (demonstration/simulation).
- Observation of interference in thin films (soap film, Newton's rings experiment).
- Determination of wavelength of light using Newton's rings.
- Fresnel's biprism experiment for measuring wavelength of monochromatic light.
- Diffraction at a single slit and measurement of slit width.
- Study of diffraction grating and determination of wavelength of spectral lines.
- Resolving power of a grating and prism – demonstration and calculation.
- Experiments on polarization of light (polarizers, analyzers, and optical activity).
- Determination of focal length of convex and concave lenses using various methods.
- Study of lens aberrations (spherical and chromatic).

- Use of a prism for deviation and dispersion studies.
- Construction and study of cardinal points of a simple lens system.
- Magnification and image formation with simple optical instruments (magnifier, microscope, telescope).
- Case-based exercises linking optical principles with visual optics and optometry applications.

Suggested Readings

- *HECHT E. Optics. Addison-Wesley.*
- *JENKINS FA, WHITE HE. Fundamentals of Optics. McGraw Hill.*
- *KHURANA AK. Theory and Practice of Optics & Refraction. CBS Publishers.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. Elsevier.*
- *PEDROTTI FL, PEDROTTI LM. Introduction to Optics. Pearson.*

Course Title: Visual Optics – I Practical	L	T	P	Cr.
Course Code: BVO208	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate principles of retinal image formation using schematic and reduced eye models.
2. Perform basic clinical measurements related to visual angle, accommodation, and convergence.
3. Identify and evaluate different refractive errors experimentally.
4. Correlate visual optics principles with clinical applications in optometry.

Course Content

List of Practicals (60 Hours)

- Introduction to lab safety, handling of optical instruments, and demonstration of schematic/reduced eye models.
- Study of refractive indices of ocular media using models/charts.
- Demonstration of cardinal points of the eye.
- Measurement of visual angle and calculation of retinal image size.
- Effect of pupil size on depth of focus (demonstration).
- Observation of the Stiles-Crawford effect (demo/visual tasks).
- Determination of near point, far point, and amplitude of accommodation.
- Measurement of convergence and calculation of AC/A ratio.
- Study and demonstration of myopia, hypermetropia, and astigmatism using trial lenses and models.
- Introduction to presbyopia: measurement of near point shift with age (demo with students).
- Determination of correction for simple refractive errors using trial lens set.
- Case-based exercises: linking accommodation and refractive errors to patient complaints.

- Viva and discussion of clinical applications of visual optics in primary eye care.

Suggested Readings

- *BORISH IM. Clinical Refraction. WB Saunders.*
- *GROSVENOR T. Primary Care Optometry. Butterworth-Heinemann.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. Elsevier.*
- *DUKE-ELDER S. System of Ophthalmology, Vol. V: Ophthalmic Optics and Refraction. Henry Kimpton.*
- *KHUFFMAN J. Clinical Ocular Anatomy and Physiology. Wolters Kluwer.*

Course Title: Basic Microbiology & Pathology Practical	L	T	P	Cr.
Course Code: BVO209	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate proper laboratory safety, specimen handling, and use of basic microbiological equipment.
2. Perform fundamental microbiological techniques such as staining, culture, and sterilization.
3. Identify common pathogenic organisms through microscopic and culture methods.
4. Recognize histopathological changes in tissues through slide observation.
5. Correlate microbiological and pathological findings with clinical relevance in healthcare and optometry.

Course Content

List of Practicals (60 Hours)

- Microbiology Practicals
  - Introduction to laboratory safety, biosafety measures, and disposal of biomedical waste.
  - Familiarization with microscopes and common laboratory instruments.
  - Preparation and sterilization of culture media (autoclaving, filtration).
  - Aseptic techniques for handling microbial cultures.
  - Gram staining technique and identification of Gram-positive and Gram-negative bacteria.
  - Acid-fast staining (Ziehl–Neelsen method).
  - Hanging drop preparation for motility demonstration.
  - Culture methods: streak plate, pour plate, and spread plate techniques.
  - Antibiotic sensitivity testing (demonstration of Kirby–Bauer method).

- Observation of fungal elements by KOH preparation.

- Pathology Practicals
  - Introduction to handling of tissue specimens and preparation of histology slides.
  - Identification of cellular injury and degenerations (microscopy).
  - Observation of acute and chronic inflammatory changes on slides.
  - Study of edema, thrombosis, and embolism (demonstration through charts/slides).
  - Microscopic study of granulomatous inflammation (e.g., tuberculosis slide).
  - Histopathological demonstration of normal vs. diseased ocular tissues (cornea, retina, conjunctiva – prepared slides).
  - Case-based exercises correlating microbiology/pathology with clinical conditions.
  - Practical record maintenance, viva, and group discussion.

Suggested Readings

- *ANANTHANARAYAN R, PANIKER CKJ. Textbook of Microbiology. Universities Press.*
- *PARIJA SC. Textbook of Microbiology and Immunology. Elsevier.*
- *PRESCOTT LM, HARLEY JP, KLEIN DA. Microbiology. McGraw Hill.*
- *ROBBINS SL, COTRAN RS, KUMAR V. Robbins Basic Pathology. Elsevier.*
- *CHANDRA P. Practical Pathology. CBS Publishers.*

Course Title: General Pharmacology Practical	L	T	P	Cr.
Course Code: BVO210	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate basic laboratory techniques in pharmacology.
2. Understand the dose–response relationship using graphical methods.
3. Evaluate the effects of drugs on different organ systems using suitable models.
4. Perform simple bioassays to estimate drug activity.
5. Apply ethical principles and safety guidelines in pharmacology practicals.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to laboratory animals and handling techniques (theoretical demonstration / computer simulation).
- Study of routes of drug administration in experimental models.
- Determination of dose–response curve of an agonist (graphical method).
- Study of the effect of autonomic drugs (sympathomimetic, parasympathomimetic, sympatholytic, parasympatholytic) on suitable animal tissues (simulation).
- Study of the effects of drugs on isolated frog heart / rabbit intestine (virtual or simulated models).
- Bioassay of histamine using guinea pig ileum preparation (simulation).
- Bioassay of acetylcholine by matching / interpolation method (simulation).
- Demonstration of drug antagonism (e.g., acetylcholine vs atropine).
- Effect of central nervous system stimulants and depressants in experimental animals (open field / actophotometer / simulated models).
- Effect of diuretics in experimental animals.

- Determination of local anesthetic activity (nerve block in frog/simulation).
- Determination of analgesic activity using simple methods (tail flick / hot plate / acetic acid writhing test).
- Determination of anti-inflammatory activity (carrageenan-induced paw edema model / simulation).
- Study of sedative–hypnotic effect of drugs.
- Demonstration of digitalis effect on isolated frog heart (simulation).
- Ethical guidelines and alternatives to animal experimentation in pharmacology (3Rs principle).

Suggested Readings

- *TRIPATHI KD. Essentials of Medical Pharmacology. 9th ed. Jaypee Brothers; 2024.*
- *RANG HP, DALE MM, RITTER JM, FLOWER RJ, HENDERSON G. Rang and Dale's Pharmacology. 10th ed. Elsevier; 2021.*
- *GOTH A. Medical Pharmacology. 14th ed. McGraw Hill; 2020.*
- *SHARMA HL, SHARMA KK. Principles of Pharmacology. 3rd ed. Paras Medical Publisher; 2019.*
- *BARAR FS. Essentials of Pharmacotherapeutics. 6th ed. S. Chand; 2018.*
- *GP MOHAN. Practical Pharmacology for Medical Students. Elsevier; 2020.*

Course Title: Environmental Sciences	L	T	P	Cr
Course Code: BVO211	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the basic concepts of environment, ecology, and biodiversity.
2. Analyze the impact of human activities on natural resources and ecosystems.
3. Identify sources and effects of environmental pollution and explore control measures.
4. Recognize the role of sustainable development and environmental policies.
5. Apply principles of environmental conservation in healthcare and community practice.

Course Contents

UNIT I – Introduction to Environmental Studies (10 Hours)

- Definition, scope, and importance of environmental studies
- Components of the environment: atmosphere, lithosphere, hydrosphere, biosphere
- Ecosystem: structure, functions, energy flow, food chains, food webs, ecological pyramids
- Biodiversity: levels of biodiversity, value of biodiversity, threats to biodiversity, conservation methods (in-situ and ex-situ)

UNIT II – Natural Resources and Associated Problems (10 Hours)

- Forest resources: deforestation, afforestation, forest conservation
- Water resources: utilization, overexploitation, water conservation methods, watershed management
- Mineral resources: exploitation and environmental effects
- Food resources: world food problems, effects of modern agriculture, sustainable agriculture
- Energy resources: renewable and non-renewable energy, role of alternate energy sources

- Land resources: land degradation, soil erosion, desertification

UNIT III – Environmental Pollution (5 Hours)

- Air pollution: causes, effects, and control measures
- Water pollution: sources, effects, and treatment methods
- Soil pollution: causes, effects, and prevention
- Noise pollution: sources, health hazards, and control
- Solid waste management: classification, methods of disposal, recycling
- Role of individuals in pollution prevention

UNIT IV – Social Issues and the Environment (5 Hours)

- Concept of sustainable development
- Climate change, global warming, ozone layer depletion, acid rain, nuclear hazards
- Environmental ethics and environmental protection acts in India
- Role of information technology in environment and human health
- Public awareness programs and case studies

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *AGARWAL KC. Environmental Biology. Nidhi Publishers; 2001.*
- *ODUM EP. Fundamentals of Ecology. 5th ed. Cengage Learning; 2004.*
- *RAO MN, DATTA AK. Waste Water Treatment. Oxford & IBH Publishing; 1987.*
- *RAJAGOPALAN R. Environmental Studies: From Crisis to Cure. 3rd ed. Oxford University Press; 2016.*
- *BHARUCHA E. Textbook of Environmental Studies for Undergraduate Courses. Universities Press; 2013.*
- *MILLER GT, SPOOLMAN S. Environmental Science. 15th ed. Cengage Learning; 2018.*

Course Title: First Aid	L	T	P	Cr
Course Code: BVO212	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the principles and importance of first aid in emergencies.
2. Identify common medical and surgical emergencies requiring immediate care.
3. Demonstrate basic first aid skills for burns, fractures, bleeding, shock, poisoning, and cardiopulmonary resuscitation (CPR).
4. Recognize when to provide immediate care and when to seek professional medical help.
5. Apply safety measures and ethical principles while providing first aid.

Course Contents

UNIT I – Introduction to First Aid (10 Hours)

- Definition, principles, and scope of first aid
- Role of a first aider and legal/ethical considerations
- First aid kit: contents and uses
- Patient assessment: ABC (Airway, Breathing, Circulation), primary and secondary survey
- Transport of injured persons and methods of bandaging

UNIT II – First Aid for Common Injuries and Emergencies (10 Hours)

- First aid in bleeding, hemorrhage, and shock
- First aid in burns, scalds, and electrical injuries
- First aid in fractures, dislocations, and sprains
- First aid in head injury and spinal injury
- First aid in poisoning, bites, and stings (snake bite, insect bite, dog bite)

UNIT III – First Aid in Medical Emergencies (5 Hours)

- First aid in fainting, syncope, and seizures

- First aid in heart attack and stroke
- First aid in choking and respiratory emergencies
- First aid in allergic reactions and anaphylaxis

UNIT IV – Life-Saving Techniques and Disaster Preparedness (5 Hours)

- Cardiopulmonary resuscitation (CPR): adult and child
- Basic life support (BLS) principles
- First aid in drowning and near-drowning cases
- First aid in mass casualty incidents and disaster preparedness
- Importance of community first aid training and awareness

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *AMERICAN RED CROSS. First Aid/CPR/AED Participant's Manual. StayWell; 2021.*
- *ST JOHN AMBULANCE, BRITISH RED CROSS. First Aid Manual. 11th ed. Dorling Kindersley; 2021.*
- *SUBRAMANIAN N. A Textbook of First Aid and Emergency Nursing. Jaypee Brothers; 2017.*
- *KNIGHT B. First Aid: Principles and Practice. Elsevier; 2019.*
- *AMERICAN HEART ASSOCIATION. Basic Life Support (BLS) Provider Manual. 2020.*
- *PARIKH CK. First Aid and Emergency Care. CBS Publishers; 2016.*

Semester 3rd

Course Title: Visual Optics – II	L	T	P	Cr
Course Code: BVO301	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the optical principles underlying image formation in the human eye.
2. Understand the concepts of accommodation, convergence, and refractive errors.
3. Analyze the role of spectacles, contact lenses, and optical instruments in correcting vision.
4. Interpret visual performance parameters such as visual acuity and contrast sensitivity.
5. Apply theoretical knowledge of visual optics to clinical optometry practice.

Course Contents

UNIT I – Optics of the Eye (10 Hours)

- Reduced eye and schematic eye models
- Cardinal points of the eye
- Ametropia: myopia, hyperopia, astigmatism, presbyopia – optical basis
- Far point and near point of the eye
- Effect of accommodation on the optical system

UNIT II – Refractive Errors and Their Optical Correction (10 Hours)

- Optical principles of correction of myopia and hyperopia
- Astigmatism: regular and irregular; Sturm's conoid and interval of Sturm
- Spherical and cylindrical lenses in correction of astigmatism
- Presbyopia: near addition and spectacle correction

- Anisometropia and aniseikonia: optical basis and management

UNIT III – Optical Instruments in Vision Care (5 Hours)

- Principles of retinoscopy and autorefractometry
- Principles of keratometry and pachymetry
- Principles of phoropter and trial frame use
- Basic optics of ophthalmoscope and slit-lamp biomicroscope

UNIT IV – Visual Performance and Applied Optics (5 Hours)

- Visual acuity: determinants and measurement methods
- Contrast sensitivity and glare
- Depth of focus and depth of field in vision
- Chromatic and spherical aberrations of the eye
- Effect of pupil size on vision and optical performance

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *EFRON N. Optometry: Science, Techniques and Clinical Management. 3rd ed. Elsevier; 2020.*
- *GROSVENOR T, GROSVENOR B. Primary Care Optometry. 5th ed. Elsevier; 2007.*
- *SMITH G, ATCHISON DA. The Eye and Visual Optical Instruments. Cambridge University Press; 1997.*
- *ROSENFIELD M, LOGAN N. Optometry: Visual Optics and Refraction. Butterworth-Heinemann; 2009.*

Course Title: Clinical Examination of Visual System – I	L	T	P	Cr
Course Code: BVO302	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the basic principles and techniques of clinical examination of the visual system.
2. Perform a systematic evaluation of visual acuity, binocular vision, and ocular motility.
3. Understand the procedures for anterior and posterior segment assessment.
4. Identify common abnormalities in the visual system through clinical examination.
5. Apply appropriate clinical methods in routine optometry practice.

Course Contents

UNIT I – Introduction to Clinical Examination (10 Hours)

- Principles of clinical examination in optometry
- Recording case history and patient communication
- Visual acuity testing: distance and near vision, Snellen's chart, LogMAR chart
- Refraction techniques: objective and subjective refraction basics
- Recording and interpretation of clinical findings

UNIT II – Assessment of Binocular Vision and Ocular Motility (10 Hours)

- Ocular dominance and fixation disparity
- Cover tests (cover–uncover, alternate cover)
- Ocular motility testing: versions, ductions, and vergence movements
- Maddox rod, Maddox wing, and Maddox cross tests
- Near point of convergence (NPC) and accommodative facility

UNIT III – Examination of Anterior Segment (5 Hours)

- External eye examination (lids, conjunctiva, cornea, sclera)
- Assessment with torch light and magnifiers
- Basic principles of slit-lamp biomicroscopy
- Detection of common anterior segment abnormalities (conjunctivitis, keratitis, corneal opacity, etc.)

UNIT IV – Examination of Posterior Segment (5 Hours)

- Principles of ophthalmoscopy (direct and indirect)
- Evaluation of optic disc, macula, and retinal vessels
- Recognition of common posterior segment findings (papilledema, diabetic retinopathy, glaucoma changes)
- Documentation and interpretation of fundus findings

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers; 2023.*
- *EFRON N. Optometry: Science, Techniques and Clinical Management. 3rd ed. Elsevier; 2020.*
- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2020.*
- *ROSENFIELD M, LOGAN N. Optometry: Visual Optics and Clinical Examination. Butterworth-Heinemann; 2009.*

Course Title: Optometric Instruments & Dispensing – I	L	T	P	Cr
Course Code: BVO303	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the working principles of basic optometric instruments.
2. Demonstrate the correct use of instruments for clinical eye examination.
3. Understand the principles of ophthalmic lenses and their dispensing.
4. Identify and apply different lens materials, designs, and coatings for optical correction.
5. Gain introductory knowledge of spectacle frame types, selection, and adjustments.

Course Contents

UNIT I – Introduction to Optometric Instruments (10 Hours)

- Overview of commonly used optometric instruments
- Trial frame and trial lenses: design, types, and uses
- Lensometer (manual and automated): principle, parts, and measurement of lens power, axis, and prism
- Retinoscope: principle and types
- Keratometer: principle, procedure, and clinical significance

UNIT II – Ophthalmic Lenses (10 Hours)

- Types of ophthalmic lenses: spherical, cylindrical, spherocylindrical
- Lens parameters: power, thickness, curvature, refractive index
- Types of lens materials: crown glass, CR-39, polycarbonate, high-index plastics
- Aspheric lenses: principles and advantages
- Lens coatings: anti-reflective, scratch-resistant, UV-protective, blue-light filter

UNIT III – Spectacle Frames (5 Hours)

- Classification of spectacle frames: full-rim, half-rim, rimless
- Frame materials: metal, plastic, combination
- Frame measurements and markings
- Frame selection based on facial shape, lens type, and patient needs

UNIT IV – Basics of Optical Dispensing (5 Hours)

- Principles of optical dispensing and patient counseling
- Interpupillary distance (IPD) and segment height measurement
- Fitting of single-vision lenses
- Introduction to bifocal and progressive addition lenses
- Adjustment and alignment of spectacles

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *JALIWAL KK. Ophthalmic Lenses and Dispensing. Jaypee Brothers; 2019.*
- *BROOKS CW, KIELY PM. Ophthalmic Lenses and Dispensing. 3rd ed. Butterworth-Heinemann; 2020.*
- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *MOORE L. Clinical Optics and Refraction. Elsevier; 2017.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *GROSVE NOR T. Primary Care Optometry. 5th ed. Elsevier; 2007.*

Course Title: Ocular Diseases – I	L	T	P	Cr
Course Code: BVO304	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the etiology, clinical features, and basic management of common ocular diseases.
2. Identify ocular conditions affecting the eyelids, conjunctiva, cornea, and sclera.
3. Differentiate between infectious and non-infectious eye disorders.
4. Recognize red-flag signs requiring referral for specialist care.
5. Apply knowledge of ocular diseases in preliminary optometric examination and patient counseling.

Course Contents

UNIT I – Diseases of the Eyelids (10 Hours)

- Congenital anomalies: ptosis, coloboma, epicanthus
- Inflammatory conditions: hordeolum externum (stye), hordeolum internum, chalazion, blepharitis
- Malpositions of eyelids: entropion, ectropion, trichiasis
- Tumors of eyelids (benign and malignant)
- Trauma-related lid disorders

UNIT II – Diseases of the Conjunctiva (10 Hours)

- Congenital anomalies of conjunctiva
- Inflammatory conditions: acute conjunctivitis, chronic conjunctivitis, allergic conjunctivitis, trachoma
- Degenerative conditions: pinguecula, pterygium
- Conjunctival tumors
- Conjunctival xerosis and xerophthalmia (Vitamin A deficiency)

UNIT III – Diseases of the Cornea (5 Hours)

- Congenital anomalies of cornea
- Corneal ulcers: bacterial, viral, fungal
- Keratitis (superficial and deep)
- Corneal dystrophies (brief overview)
- Corneal injuries and scarring

UNIT IV – Diseases of the Sclera (5 Hours)

- Episcleritis and scleritis
- Staphyloma (anterior and posterior)
- Blue sclera and other congenital anomalies
- Scleral thinning and degenerations
- Trauma-related scleral conditions

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers; 2023.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2020.*
- *PARSONS JH. Parsons' Diseases of the Eye. 22nd ed. Elsevier; 2018.*
- *FOSTER CS, AZAR DT, D'AMICO DJ. Smolin and Thoft's The Cornea: Scientific Foundations and Clinical Practice. 4th ed. Lippincott Williams & Wilkins; 2005.*
- *YANOFF M, DUKER JS. Ophthalmology. 5th ed. Elsevier; 2019.*
- *TROBE JD. The Physician's Guide to Eye Care. 4th ed. American Academy of Ophthalmology; 2016.*

Course Title: Ophthalmic Optics – I	L	T	P	Cr
Course Code: BVO305	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the fundamental optical principles of ophthalmic lenses.
2. Differentiate between various types of spectacle lenses and their applications.
3. Understand the parameters affecting lens performance and wearer comfort.
4. Calculate and interpret vergence, focal length, and effective power in ophthalmic lenses.
5. Recognize the importance of lens materials, designs, and coatings in dispensing practice.

Course Contents

UNIT I – Introduction to Ophthalmic Optics (10 Hours)

- Nature and properties of light relevant to ophthalmic optics
- Definition of vergence, focal length, power, and principal planes
- Nomenclature and sign conventions in lens optics
- Image formation by spherical lenses (converging and diverging)
- Thin lens formula and lens combinations

UNIT II – Ophthalmic Lenses (10 Hours)

- Types of ophthalmic lenses: spherical, cylindrical, toric, spherocylindrical
- Lens forms: meniscus, plano-convex, plano-concave, equiconvex, equiconcave
- Transposition of lenses (plus and minus cylinder form)
- Toric surfaces and toric lenses
- Concepts of sphere-cylinder combination and prescription writing basics

UNIT III – Lens Materials and Manufacture (5 Hours)

- Glass and plastic materials (CR-39, polycarbonate, high-index plastics)
- Refractive index, Abbe's number, specific gravity, and their clinical significance
- Lens surfacing and finishing (brief introduction)
- Safety standards and impact resistance (ANSI, ISO)

UNIT IV – Lens Aberrations and Coatings (5 Hours)

- Monochromatic aberrations: spherical aberration, coma, astigmatism, curvature of field, distortion
- Chromatic aberration: longitudinal and transverse
- Methods of reducing aberrations (aspheric lenses, lens design modifications)
- Lens coatings: anti-reflection, scratch-resistant, UV protection, blue-light filters

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *JALIWAL KK. Ophthalmic Lenses and Dispensing. Jaypee Brothers; 2019.*
- *BROOKS CW, KIELY PM. Ophthalmic Lenses and Dispensing. 3rd ed. Butterworth-Heinemann; 2020.*
- *MOORE L. Clinical Optics. Elsevier; 2017.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Elsevier; 2007.*
- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *ROSENFIELD M, LOGAN N. Optometry: Visual Optics and Refraction. Butterworth-Heinemann; 2009.*

Course Title: Visual Optics – II Practical	L	T	P	Cr.
Course Code: BVO306	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform practical experiments related to refraction and visual optics.
2. Measure visual acuity, accommodation, and convergence using standard procedures.
3. Demonstrate the use of optometric instruments such as retinoscope, lensometer, and keratometer.
4. Apply optical principles to correction of refractive errors.
5. Record and interpret clinical findings for patient management.

Course Content

List of Practicals / Experiments (60 Hours):

- Measurement of visual acuity using Snellen and LogMAR charts.
- Determination of far point and near point of accommodation.
- Measurement of amplitude of accommodation (Push-up, Push-down, and Sheard's method).
- Measurement of near point of convergence (NPC).
- Practice of retinoscopy on model eye and human subjects.
- Subjective refraction: step-by-step technique.
- Determination of astigmatism using Jackson's cross-cylinder and trial lenses.
- Measurement of interpupillary distance (IPD) – near and distance.
- Lensometry: verification of single vision, bifocal, and progressive addition lenses.
- Measurement of vertex distance, pantoscopic tilt, and optical center alignment.
- Keratometry: measurement of corneal curvature and detection of astigmatism.
- Demonstration of autorefractometer and comparison with retinoscopy.
- Effect of pupil size on depth of focus and visual acuity.

- Determination of contrast sensitivity and glare.
- Demonstration of aberrations in the eye using optical models.
- Case recording of refraction and prescription writing.

Suggested Readings

- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *ROSENFIELD M, LOGAN N. Optometry: Visual Optics and Refraction. Butterworth-Heinemann; 2009.*
- *SMITH G, ATCHISON DA. The Eye and Visual Optical Instruments. Cambridge University Press; 1997.*
- *MOORE L. Clinical Optics. Elsevier; 2017.*
- *EFRON N. Optometry: Science, Techniques and Clinical Management. 3rd ed. Elsevier; 2020.*

Course Title: Clinical Examination of Visual System – I Practical	L	T	P	Cr.
Course Code: BVO307	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform systematic clinical examination of the visual system.
2. Assess visual acuity for distance and near vision using standard charts.
3. Demonstrate ocular motility and binocular vision assessment techniques.
4. Examine the anterior and posterior segment of the eye using appropriate instruments.
5. Record, interpret, and present clinical findings in a professional manner.

Course Content

List of Practicals / Experiments (60 Hours):

- Case history taking and clinical recording in optometry practice.
- Measurement of distance visual acuity using Snellen's and LogMAR charts.
- Measurement of near visual acuity using standard near vision charts.
- Objective refraction (demonstration of retinoscopy).
- Subjective refraction (step-by-step method).
- Cover–uncover test and alternate cover test for ocular alignment.
- Ocular motility examination: versions, ductions, and vergence assessment.
- Measurement of near point of convergence (NPC).
- Assessment of near point of accommodation (NPA).
- Maddox rod test and interpretation.
- Maddox wing and Maddox cross demonstration.
- Evaluation of fusional reserves using prisms.

- External examination of the eye (lids, conjunctiva, cornea, sclera).
- Torchlight examination of anterior segment.
- Slit-lamp biomicroscopy: demonstration and practice.
- Direct ophthalmoscopy: demonstration of optic disc and macula.
- Indirect ophthalmoscopy: introduction and demonstration.
- Documentation of findings and preparation of case records.

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers; 2023.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2020.*
- *BORISH IM. Clinical Refraction. 2nd ed. WB Saunders; 2006.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *ROSENFIELD M, LOGAN N. Optometry: Visual Optics and Clinical Examination. Butterworth-Heinemann; 2009.*
- *TROBE JD. The Physician's Guide to Eye Care. 4th ed. American Academy of Ophthalmology; 2016.*

Course Title: Optometric Instruments & Dispensing – I Practical	L	T	P	Cr.
Course Code: BVO308	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate handling and maintenance of basic optometric instruments.
2. Perform measurements using instruments like lensometer, keratometer, and focimeter.
3. Identify ophthalmic lenses, frames, and optical components used in dispensing.
4. Apply principles of lens fitting, frame adjustment, and repair.
5. Record, interpret, and evaluate optical parameters accurately for dispensing purposes.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction, care, and maintenance of optometric instruments.
- Use of trial set and trial frame – assembling, fitting, and adjustments.
- Measurement of interpupillary distance (IPD) and segment height.
- Identification of spherical, cylindrical, bifocal, and progressive lenses.
- Handling and operating a lensometer/focimeter.
- Measurement of lens power, axis, and prism.
- Determination of base curve and lens thickness.
- Introduction and demonstration of keratometer – measurement of corneal curvature.
- Hands-on practice with pupillometer.
- Identification and selection of ophthalmic frames (metal, plastic, rimless, etc.).
- Frame adjustments and alignment techniques.
- Practical dispensing exercises – lens fitting into frames.
- Handling of protective eyewear and safety glasses.

- Introduction to automated instruments (digital lensmeter, auto-refractor – demonstration).
- Record keeping, documentation, and error minimization in dispensing practice.

Suggested Readings

- *KHURANA AK. Theory and Practice of Optics and Refraction. 5th ed. New Delhi: Elsevier; 2017.*
- *JALIWALA RM. Optics and Refraction in Optometry. 2nd ed. Jaypee Brothers Medical Publishers; 2019.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Butterworth-Heinemann; 2006.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.*

Course Title: Ocular Diseases – I Practical	L	T	P	Cr.
Course Code: BVO309	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify and describe common anterior and posterior segment ocular diseases through clinical observation.
2. Demonstrate basic clinical examination skills relevant to ocular disease detection.
3. Record patient history and ocular findings in a systematic manner.
4. Recognize clinical signs of ocular surface disorders, lid abnormalities, and adnexal conditions.
5. Differentiate between normal and pathological ocular conditions.
6. Apply infection control measures while handling ocular cases.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to ocular disease examination set-up, instruments, and safety.
- Recording detailed ocular and systemic case history.
- External ocular examination – inspection of lids, lashes, conjunctiva, sclera.
- Assessment of ocular adnexa – lacrimal apparatus, orbit, and extraocular muscles.
- Examination techniques for corneal clarity, size, and surface changes.
- Conjunctival evaluation – recognizing congestion, discharge, and other abnormalities.
- Identification of clinical signs in common lid diseases (chalazion, hordeolum, blepharitis, entropion, ectropion).
- Practical sessions on conjunctival disorders (conjunctivitis, pterygium, pinguecula).
- Demonstration of corneal pathologies (keratitis, corneal ulcer, corneal opacity).

- Introduction to slit-lamp biomicroscopy and observation of anterior segment diseases.
- Practice in recognizing dry eye signs and performing basic diagnostic tests (Schirmer's test, tear film break-up time).
- Clinical evaluation of pupillary reactions in ocular diseases.
- Documentation and interpretation of common ocular disease findings.
- Exposure to photographic images and case discussions on anterior segment disorders.
- Introduction to red eye differential diagnosis through case scenarios.

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers Medical Publishers; 2019.*
- *PARSONS JH. Parsons' Diseases of the Eye. 22nd ed. New Delhi: Elsevier; 2018.*
- *YANOFF M, DUKER JS. Ophthalmology. 5th ed. Elsevier; 2019.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 8th ed. Elsevier; 2016.*
- *GIBSON JM. Clinical Skills for OSCEs in Ophthalmology. CRC Press; 2013.*

Course Title: Ophthalmic Optics – I Practical	L	T	P	Cr.
Course Code: BVO310	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate practical skills in handling ophthalmic lenses and related instruments.
2. Identify and classify ophthalmic lenses based on power, type, and design.
3. Perform basic lens measurements (power, thickness, curvature, prism).
4. Differentiate between spherical, cylindrical, toric, bifocal, and progressive lenses.
5. Apply principles of optics in practical situations related to ophthalmic dispensing.
6. Record accurate optical measurements for clinical and dispensing purposes.

Course Content

List of Practicals / Experiments (60 Hours):

- Introduction to ophthalmic lenses – handling, care, and safety precautions.
- Identification of spherical convex and concave lenses.
- Identification of cylindrical and toric lenses.
- Determination of lens power using a manual lensometer.
- Determination of axis and cylindrical component.
- Measurement of prism power and base direction.
- Measurement of lens thickness using a thickness gauge.
- Determination of base curve and curvature using a spherometer.
- Distinguishing between plus and minus lenses by hand neutralization method.

- Differentiation between high-index, low-index, and polycarbonate lenses.
- Identification of bifocal and multifocal lenses.
- Identification of progressive addition lenses (PALs).
- Measurement of optical center and marking.
- Exercises on lens decentration and prismatic effect.
- Demonstration of tinted, photochromic, and coated lenses.

Suggested Readings

- *JALIWALA RM. Optics and Refraction in Optometry. 2nd ed. Jaypee Brothers Medical Publishers; 2019.*
- *KHURANA AK. Theory and Practice of Optics and Refraction. 5th ed. Elsevier; 2017.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Butterworth-Heinemann; 2006.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*

Course Title: Community Health & Primary Care	L	T	P	Cr
Course Code: BVO311	3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles of community health and primary health care delivery.
2. Describe the structure and functions of the health care system in India.
3. Identify common community health problems and suggest preventive strategies.
4. Apply concepts of health promotion and disease prevention in primary care.
5. Demonstrate knowledge of national health programs and policies.
6. Communicate effectively with individuals, families, and communities in a health care context.

Course Contents

UNIT – I: Introduction to Community Health (15 Hours)

- Definition and concepts of health, disease, and community health.
- Determinants of health and indicators of health status.
- Levels of prevention and health promotion strategies.
- Role of primary health care in disease prevention and control.

UNIT – II: Health Care Delivery System (10 Hours)

- Structure of health care services in India (Sub-centre, PHC, CHC, District hospital).
- Roles of health professionals in primary care.
- Health care team approach.
- Concepts of family medicine and community-oriented primary care.

UNIT – III: Common Community Health Problems (10 Hours)

- Communicable diseases (Tuberculosis, Malaria, HIV/AIDS, Diarrheal diseases).
- Non-communicable diseases (Hypertension, Diabetes, Cancer).
- Maternal and child health issues.
- Nutrition and lifestyle-related problems.

UNIT – IV: National Health Programs & Primary Care Interventions (10 Hours)

- Overview of major national health programs (RNTCP/NTEP, NVBDCP, RCH, NPCDCS).
- Immunization and school health services.
- Health education and IEC strategies.
- Community participation and role of NGOs in health care.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *PARK K. Park's Textbook of Preventive and Social Medicine. 27th ed. Jabalpur: Banarsidas Bhanot Publishers; 2023.*
- *GHAI OP. Essential Preventive Medicine. 6th ed. CBS Publishers; 2018.*
- *GUPTA MC, MAHESHWARI B. Textbook of Preventive and Social Medicine. 5th ed. Jaypee Brothers; 2017.*
- *WORLD HEALTH ORGANIZATION. Primary Health Care: Now More Than Ever. World Health Report; 2008.*
- *GOVT. OF INDIA. National Health Mission: Framework for Implementation. Ministry of Health & Family Welfare; latest edition.*

Semester 4th

Course Title: Clinical Examination of Visual System – II	L	T	P	Cr
Course Code: BVO401	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform advanced clinical examination techniques for the assessment of the visual system.
2. Evaluate ocular motility and binocular vision anomalies.
3. Conduct anterior and posterior segment examinations using appropriate instruments.
4. Interpret clinical signs to support diagnosis of visual system disorders.
5. Record findings systematically and correlate them with ocular and systemic conditions.

Course Contents

UNIT – I: Ocular Motility and Binocular Vision (10 Hours)

- Principles of ocular motility.
- Methods for assessing ocular movements.
- Evaluation of heterophoria and heterotropia.
- Cover–uncover test, alternate cover test, prism bar cover test.
- Maddox rod, Hess chart, and synoptophore introduction.

UNIT – II: Anterior Segment Examination (10 Hours)

- Slit-lamp biomicroscopy: principles, illumination techniques, and clinical applications.
- Examination of lids, conjunctiva, cornea, anterior chamber, iris, and lens.
- Recognition of anterior segment abnormalities.
- Recording and interpretation of anterior segment findings.

UNIT – III: Posterior Segment Examination (5 Hours)

- Principles of direct and indirect ophthalmoscopy.

- Techniques of fundus examination.
- Identification of normal and abnormal optic disc, macula, and retinal vessels.

UNIT – IV: Clinical Documentation and Interpretation (5 Hours)

- Recording visual findings and case documentation.
- Interpretation of examination results.
- Correlation of ocular findings with systemic diseases.
- Introduction to digital imaging and documentation in ocular examinations.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 8th ed. Elsevier; 2016.*
- *EFRON N. Clinical Procedures in Primary Eye Care. 5th ed. Elsevier; 2021.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers Medical Publishers; 2019.*
- *TROILO D. Clinical Procedures for Ocular Examination. 4th ed. McGraw-Hill Education; 2017.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.*

Course Title: Optometric Instruments & Dispensing – II	L	T	P	Cr
Course Code: BVO402	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles, working, and clinical applications of advanced optometric instruments.
2. Demonstrate knowledge of automated lensmeters, keratometers, and dispensing instruments.
3. Describe various ophthalmic lens materials, coatings, and designs.
4. Apply principles of spectacle dispensing including fitting, alignment, and troubleshooting.
5. Interpret optical prescriptions and recommend appropriate frames and lenses.

Course Contents

UNIT – I: Advanced Optometric Instruments (10 Hours)

- Automated and digital lensmeter.
- Auto-refractor and its clinical utility.
- Advanced keratometer and corneal topographer (introduction).
- Digital pupillometer.
- PD meters and centration devices.

UNIT – II: Ophthalmic Lenses and Materials (10 Hours)

- High-index lenses, aspheric and atoric lenses.
- Progressive addition lenses (PALs): design and applications.
- Photochromic, polarized, and tinted lenses.
- Lens coatings: anti-reflective, hard coat, UV-protective coatings.
- Safety lenses and occupational eyewear.

UNIT – III: Spectacle Frames and Fitting (5 Hours)

- Frame types and materials: metal, plastic, rimless, nylor.
- Measurements for frame selection (DBL, eye size, temple length).
- Frame alignment and common adjustments.

- Cosmetic and functional considerations in frame selection.

UNIT – IV: Dispensing and Troubleshooting (5 Hours)

- Interpretation of prescriptions with prism and cylinder corrections.
- Common dispensing errors and their correction.
- Troubleshooting problems in PALs, high-power lenses, and anisometropia.
- Documentation and patient counseling in spectacle dispensing.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *JALIWALA RM. Optics and Refraction in Optometry. 2nd ed. Jaypee Brothers Medical Publishers; 2019.*
- *KHURANA AK. Theory and Practice of Optics and Refraction. 5th ed. Elsevier; 2017.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Butterworth-Heinemann; 2006.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*

Course Title: Ocular Diseases – II	L	T	P	Cr
Course Code: BVO403	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the etiology, clinical features, and classification of posterior segment ocular diseases.
2. Recognize signs and symptoms of retinal, choroidal, and optic nerve disorders.
3. Explain diagnostic methods used in the evaluation of posterior segment diseases.
4. Correlate systemic conditions with posterior ocular manifestations.
5. Outline the principles of management and referral for posterior segment disorders.

Course Contents

UNIT – I: Diseases of the Retina (10 Hours)

- Retinal vascular disorders: hypertensive retinopathy, diabetic retinopathy, retinal vein/artery occlusions.
- Retinal degenerations and dystrophies: age-related macular degeneration, retinitis pigmentosa.
- Retinal detachment: rhegmatogenous, tractional, exudative.

UNIT – II: Diseases of the Choroid and Vitreous (10 Hours)

- Choroiditis and choroidal tumors.
- Central serous chorioretinopathy.
- Vitreous opacities, hemorrhage, and degenerations.
- Posterior uveitis.

UNIT – III: Diseases of the Optic Nerve (5 Hours)

- Optic neuritis and papillitis.
- Optic atrophy and disc edema.
- Glaucomatous optic neuropathy (introduction).

UNIT – IV: Diagnostic Methods and Clinical Correlation (5 Hours)

- Ophthalmoscopy (direct and indirect).

- Fundus photography and fluorescein angiography (introduction).
- Optical coherence tomography (OCT) basics.
- Correlation of systemic diseases with ocular manifestations (diabetes, hypertension, anemia).

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. Jaypee Brothers Medical Publishers; 2019.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 8th ed. Elsevier; 2016.*
- *PARSONS JH. Parsons' Diseases of the Eye. 22nd ed. Elsevier; 2018.*
- *YANOFF M, DUKER JS. Ophthalmology. 5th ed. Elsevier; 2019.*
- *VEMUGANTI GK. Posterior Segment Diseases: Clinical Diagnosis and Management. Jaypee Brothers; 2014.*

Course Title: Ophthalmic Optics – II	L	T	P	Cr
Course Code: BVO404	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the optical principles underlying advanced ophthalmic lens designs.
2. Differentiate between various types of bifocal, trifocal, and progressive lenses.
3. Describe lens aberrations and methods of their correction.
4. Discuss the significance of lens materials, coatings, and tints in ophthalmic practice.
5. Apply the concepts of prismatic effects and lens decentration in dispensing.

Course Contents

UNIT – I: Aberrations in Ophthalmic Lenses (10 Hours)

- Monochromatic aberrations: spherical aberration, coma, distortion, curvature of field, astigmatism.
- Chromatic aberration: longitudinal and transverse.
- Methods of minimizing aberrations in ophthalmic lenses.

UNIT – II: Multifocal Lenses (10 Hours)

- Bifocal lenses: types (cemented, fused, one-piece), segment shapes, positioning.
- Trifocal lenses: construction, advantages, and limitations.
- Progressive addition lenses (PALs): design, advantages, fitting considerations, and common problems.

UNIT – III: Special Lenses and Coatings (5 Hours)

- High-index, aspheric, and atoric lenses.
- Safety lenses and occupational lenses.
- Tinted, photochromic, polarized lenses.
- Lens coatings: AR coating, hard coating, UV coating.

UNIT – IV: Prismatic Effects and Lens Applications (5 Hours)

- Prentice's Rule and prismatic effect of decentered lenses.
- Compensating unwanted prism in spectacles.
- Fresnel prisms and therapeutic uses.
- Considerations in anisometropia and high prescriptions.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *JALIWALA RM. Optics and Refraction in Optometry. 2nd ed. Jaypee Brothers Medical Publishers; 2019.*
- *KHURANA AK. Theory and Practice of Optics and Refraction. 5th ed. Elsevier; 2017.*
- *MOORE JE, HARRIS WF. Clinical Optics and Refraction. Butterworth-Heinemann; 2008.*
- *ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Butterworth-Heinemann; 2006.*

Course Title: Contact Lens – I	L	T	P	Cr
Course Code: BVO405	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the history, development, and classification of contact lenses.
2. Describe the anatomy and physiology of the cornea and tear film relevant to contact lens wear.
3. Differentiate between rigid and soft contact lenses based on design, material, and fitting principles.
4. Discuss the optics of contact lenses and their effect on vision.
5. Recognize indications, advantages, and limitations of contact lens use.

Course Contents

UNIT – I: Introduction to Contact Lenses (10 Hours)

- History and evolution of contact lenses.
- Classification of contact lenses (based on material, design, wearing schedule, and replacement modality).
- Comparison of spectacles vs contact lenses.
- Basic terminology in contact lens practice (BOZR, BOZD, TD, BVP, etc.).

UNIT – II: Anatomy and Physiology Relevant to Contact Lenses (10 Hours)

- Corneal anatomy, physiology, and transparency.
- Tear film structure and functions.
- Corneal metabolism and oxygen requirements.
- Ocular changes induced by contact lens wear.

UNIT – III: Optics of Contact Lenses (5 Hours)

- Optics of contact lenses vs spectacles.
- Vertex distance and its significance.
- Magnification, field of view, and aberrations with contact lenses.

UNIT – IV: Indications, Advantages, and Limitations (5 Hours)

- Indications for contact lens wear (cosmetic, therapeutic, refractive).
- Advantages of contact lenses over spectacles.
- Limitations and contraindications.
- Introduction to patient selection and pre-fitting considerations.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- EFRON N. Contact Lens Practice. 4th ed. Elsevier; 2023.
- BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Butterworth-Heinemann; 2006.
- MONTAGUE P, KIELY PM. Contact Lenses: Procedures and Techniques. Butterworth-Heinemann; 2003.
- HOLDEN BA, EFRON N. Current Developments in Contact Lens Practice. Butterworth-Heinemann; 2001.
- ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.

Course Title: Pediatric & Binocular Vision Optometry	L	T	P	Cr.
Course Code: BVO406	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform age-appropriate visual acuity assessment in children.
2. Conduct pediatric refraction using objective and subjective techniques.
3. Evaluate ocular motility and binocular vision functions.
4. Carry out diagnostic tests for strabismus and amblyopia.
5. Assess and interpret accommodative and vergence anomalies.
6. Document pediatric and binocular vision findings systematically.

Course Content

List of Practicals / Experiments (60 Hours):

- Pediatric case history taking – communication techniques with children and parents.
- Assessment of visual acuity in children: Cardiff cards, Lea symbols, Kay pictures, tumbling E.
- Objective refraction in children: retinoscopy techniques (static and dynamic).
- Subjective refraction in cooperative children.
- Cycloplegic refraction – indications and techniques (demonstration).
- Assessment of ocular motility: versions, ductions, pursuits, saccades.
- Cover tests: cover–uncover, alternate cover, and prism bar cover test.
- Maddox rod and Maddox wing tests for phoria and tropia detection.
- Synoptophore: introduction and demonstration.
- Assessment of suppression and amblyopia.
- Worth's four-dot test and Bagolini striated glass test.
- Stereoacuity assessment: Titmus fly test, Randot, TNO test.
- Measurement of accommodative amplitude, facility, and response.
- Measurement of fusional vergences using prism bars.
- Documentation of binocular vision anomalies and pediatric refraction cases.

Suggested Readings

- EVANS BJW. Pickwell's Binocular Vision Anomalies. 5th ed. Elsevier; 2021.
- GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.
- BORISH IM. Clinical Refraction. 2nd ed. Butterworth-Heinemann; 2006.
- SCHEIMANN MM, WICK B. Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders. 5th ed. Lippincott Williams & Wilkins; 2019.
- ROSENFIELD M, LOGAN N. Optometry: Science, Techniques and Clinical Management. 2nd ed. Butterworth-Heinemann; 2009.

Course Title: Clinical Examination of Visual System – II Practical	L	T	P	Cr.
Course Code: BVO407	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform advanced clinical examination techniques for the assessment of visual function.
2. Evaluate binocular vision and ocular motility disorders through practical methods.
3. Demonstrate proficiency in diagnostic procedures for anterior and posterior segment evaluation.
4. Interpret findings from various clinical tests for differential diagnosis.
5. Apply appropriate documentation and patient management skills in a clinical setting.

Course Content

List of Practicals / Experiments (60 Hours):

- Assessment of accommodation and convergence anomalies.
- Evaluation of heterophoria and heterotropia (cover tests, Maddox rod, Hess chart).
- Examination of ocular motility and extraocular muscle functions.
- Pupillary reflexes and their clinical significance.
- Visual field testing by confrontation method.
- Near point of convergence (NPC) and amplitude of accommodation (AA).
- Retinoscopy refinement and subjective refraction verification.
- Slit-lamp examination of anterior segment structures.
- Fundus examination using direct ophthalmoscopy.
- Recording and interpretation of clinical findings.

Suggested Readings

- *KHAUR R. Clinical Optometry. 2nd ed. New Delhi: Jaypee Brothers; 2020.*

- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.*
- *GROSVENOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *EFRON N. Contact Lens Practice. 3rd ed. Elsevier; 2017.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2019.*

Course Title: Optometric Instruments & Dispensing – II Practical	L	T	P	Cr.
Course Code: BVO408	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate proficiency in handling and operating advanced optometric instruments.
2. Perform clinical measurements using instruments such as keratometer, lensometer, and slit-lamp biomicroscope.
3. Apply techniques for accurate lens dispensing and verification of optical appliances.
4. Interpret instrument findings to support refractive error correction and visual rehabilitation.
5. Develop competency in quality control and patient-centered dispensing practices.

Course Content

List of Practicals / Experiments (60 Hours):

- Lensometry – verification of single vision, bifocal, trifocal, and progressive lenses.
- Keratometry – measurement of corneal curvature and astigmatism.
- Slit-lamp biomicroscopy – anterior segment evaluation for dispensing relevance.
- PD (Pupillary Distance) measurement – monocular and binocular methods.
- Segment height and fitting cross marking for multifocal and progressive lenses.
- Lens thickness measurement using thickness gauge.
- Demonstration and practice of focimeter for power verification.
- Hands-on practice with trial frame adjustments and interpupillary distance settings.

- Frame selection – based on facial shape, lifestyle, and prescription needs.
- Practical exercises in edging and fitting lenses into frames.
- Quality check and troubleshooting of finished spectacles.
- Maintenance and care of optical instruments.
- Case-based exercises in dispensing (e.g., high myopia, presbyopia, progressive lens wearers).

Suggested Readings

- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *JALIWALA R. Optical Dispensing. New Delhi: Jaypee Brothers; 2016.*
- *FANNIN TE, GROVES WE. Clinical Optics. 3rd ed. Butterworth-Heinemann; 1999.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *MOORE J. Optics and Refraction in Optometry. 2nd ed. Elsevier; 2018.*

Course Title: Ocular Diseases – II Practical	L	T	P	Cr.
Course Code: BVO409	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify and differentiate various ocular diseases affecting the anterior and posterior segments.
2. Demonstrate proficiency in the clinical examination and diagnostic techniques for common ocular pathologies.
3. Correlate clinical findings with patient symptoms for accurate provisional diagnosis.
4. Apply knowledge of ocular disease management in patient care and referral decisions.
5. Record, document, and interpret clinical cases effectively in a practical setting.

Course Content

List of Practicals / Experiments (60 Hours):

- Case history taking and documentation in ocular disease patients.
- Slit-lamp examination of anterior segment abnormalities (e.g., conjunctivitis, keratitis, corneal opacity).
- Evaluation of dry eye: Schirmer's test and tear break-up time (TBUT).
- Assessment of lid and adnexal diseases (chalazion, stye, blepharitis).
- Clinical examination of lens opacities (cataract grading using LOCS II/III).
- Fundus examination for retinal pathologies (e.g., diabetic retinopathy, hypertensive retinopathy).
- Recognition of glaucomatous changes: optic disc evaluation and tonometry.
- Clinical methods for detection of uveitis and keratoconjunctivitis sicca.
- Recording and interpretation of corneal ulcers and keratopathies.
- Clinical correlation of systemic diseases with ocular manifestations (e.g., thyroid eye disease).

- Practical exercises in differential diagnosis of red eye.
- Case-based presentations on ocular disease management strategies.

Suggested Readings

- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2019.*
- *YANOFF M, DUKER JS. Ophthalmology. 5th ed. Elsevier; 2018.*
- *PARSONS JH. Parson's Diseases of the Eye. 22nd ed. Butterworth-Heinemann; 2018.*
- *GUPTA A, GUPTA A. Clinical Practice in Ophthalmology. New Delhi: Jaypee Brothers; 2015.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Basic and Clinical Science Course (BCSC) Series. Latest ed.*

Course Title: Ophthalmic Optics – II Practical	L	T	P	Cr.
Course Code: BVO410	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate practical skills in ophthalmic lens design, verification, and dispensing.
2. Measure and interpret optical parameters for different types of ophthalmic lenses.
3. Apply techniques for fitting and adjustment of lenses and frames.
4. Analyze optical aberrations, prismatic effects, and corrective measures.
5. Perform quality checks of ophthalmic lenses and spectacles for patient dispensing.

Course Content

List of Practicals / Experiments (60 Hours):

- Measurement of back vertex power and front vertex power of ophthalmic lenses.
- Determination of focal length and optical center of lenses.
- Identification and verification of spherical, cylindrical, and sphero-cylindrical lenses.
- Measurement of prism power, base direction, and decentration using lensometer.
- Demonstration of chromatic and spherical aberrations in ophthalmic lenses.
- Determination of magnification and minification effects of lenses.
- Measurement of transmittance and reflectance of ophthalmic lenses (tinted, coated, and polarized lenses).
- Practical exercises on bifocal, trifocal, and progressive addition lenses (identification and marking).
- Prismatic effect of decentered lenses and Prentice's rule application.
- Exercises on toric transposition and cross cylinder verification.

- Edge thickness determination and its relevance to high-power lenses.
- Practical demonstration of antireflection coatings and photochromic lenses.
- Case-based practicals in lens selection for myopia, hyperopia, anisometropia, and presbyopia.
- Frame alignment and adjustment techniques for optimal lens fitting.
- Quality assurance procedures for ophthalmic lens dispensing.

Suggested Readings

- *JALIWALA R. Optical Dispensing. New Delhi: Jaypee Brothers; 2016.*
- *FANNIN TE, GROVES WE. Clinical Optics. 3rd ed. Butterworth-Heinemann; 1999.*
- *MOORE J. Optics and Refraction in Optometry. 2nd ed. Elsevier; 2018.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.*
- *KHURANA AK. Theory and Practice of Optics and Refraction. 4th ed. New Delhi: Elsevier; 2014.*

Course Title: Contact Lens – I Practical	L	T	P	Cr
Course Code: BVO411	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate knowledge of basic contact lens types, materials, and fitting principles.
2. Perform preliminary patient evaluation for contact lens suitability.
3. Apply clinical techniques for insertion, removal, and care of contact lenses.
4. Assess lens fitting using slit-lamp biomicroscopy and fluorescein evaluation.
5. Counsel patients on lens care, hygiene, and safe wear schedules.

Course Content

List of Practicals / Experiments (60 Hours):

- Familiarization with instruments used in contact lens practice.
- Slit lamp biomicroscopy – anterior segment examination.
- Keratometry – measurement of corneal curvature.
- Corneal topography – mapping corneal surface.
- Assessment of tear film and tear breakup time.
- Schirmer's test and fluorescein staining.
- Trial lens handling and lens care procedures.
- Soft contact lens fitting – selection, insertion, and assessment.
- Rigid gas permeable (RGP) lens fitting – selection, insertion, and assessment.
- Over-refraction and lens power calculation.
- Lens movement, centration, and coverage assessment.
- Teaching insertion and removal techniques to patients.
- Contact lens cleaning, disinfection, and storage procedures.
- Recognition of contact lens-related complications on slit lamp.
- Case discussions on clinical scenarios involving contact lenses.

Suggested Readings

- *EFRON N. Contact Lens Practice. 3rd ed. Elsevier; 2017.*
- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.*
- *BRIEN HOLDEN VISION INSTITUTE. Contact Lens Manual. Latest ed.*
- *PHILLIPS AJ, SPEEDWELL L. Contact Lenses. 5th ed. Elsevier; 2019.*
- *KHURANA AK. Theory and Practice of Optics and Refraction. 4th ed. New Delhi: Elsevier; 2014.*
- *GASSER CE. Clinical Contact Lens Practice. Jaypee Brothers; 2015.*

Course Title: Pediatric & Binocular Vision Optometry Practical	L	T	P	Cr
Course Code: BVO412	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Conduct comprehensive eye examinations in pediatric patients.
2. Assess and diagnose binocular vision anomalies.
3. Apply clinical techniques for detection and management of amblyopia and strabismus.
4. Perform tests for accommodation, vergence, and ocular motility.
5. Counsel parents and caregivers regarding pediatric visual development and treatment options.

Course Contents

List of Practicals / Experiments (60 Hours):

- History taking and communication skills for pediatric patients.
- Visual acuity assessment in infants and children (preferential looking, Cardiff cards, Lea symbols, HOTV chart).
- Assessment of fixation and following behavior.
- Retinoscopy in children (static and dynamic).
- Subjective refraction techniques in pediatric age group.
- Cover test (unilateral and alternating) at distance and near.
- Hirschberg and Krimsky tests.
- Measurement of angle of deviation using prism bar cover test.
- Ocular motility testing – versions and ductions.
- Worth four-dot test and Bagolini striated glasses test.
- Stereopsis assessment (Titmus, Randot, TNO tests).
- Measurement of near point of convergence and accommodation.
- Accommodation tests: amplitude, facility, relative accommodation.
- Fusional vergence amplitude testing with prism bars.
- Amblyopia assessment and management strategies.

- Demonstration of orthoptic exercises.
- Case discussions on strabismus and binocular vision anomalies.

Suggested Readings

- *EVANS BJW. Pickwell's Binocular Vision Anomalies. 5th ed. Butterworth-Heinemann; 2007.*
- *GROSVERNOR T. Primary Care Optometry. 5th ed. Butterworth-Heinemann; 2007.*
- *KHUDADOS A. Clinical Orthoptics. 3rd ed. Wiley-Blackwell; 2012.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2019.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *SCOTT WE, DICKINSON CM. Strabismus and Amblyopia: Experimental Basis for Advances in Clinical Management. Mosby; 2015.*

Semester 5th

Course Title: Contact Lens – II	L	T	P	Cr
Course Code: BVO501	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the properties, advantages, and limitations of specialty contact lenses.
2. Explain the fitting principles of toric, bifocal, scleral, and therapeutic lenses.
3. Apply knowledge of contact lens complications and management strategies.
4. Discuss contact lens applications in irregular corneas and diseased eyes.
5. Counsel patients regarding advanced lens options and aftercare.

Course Contents

UNIT I (10 Hours): Toric & Bifocal Contact Lenses

- Types of toric contact lenses: design, stabilization methods, and fitting principles.
- Indications, advantages, and limitations of bifocal and multifocal contact lenses.
- Clinical considerations for presbyopia correction.

UNIT II (10 Hours): Scleral & Therapeutic Contact Lenses

- Scleral and semi-scleral lenses: fitting techniques and applications.
- Bandage contact lenses – indications and fitting.
- Role of therapeutic contact lenses in ocular surface disease.

UNIT III (5 Hours): Contact Lens Complications

- Hypoxia-related complications.
- Mechanical and inflammatory complications.
- Microbial keratitis and preventive strategies.

UNIT IV (5 Hours): Special Applications & Advances

- Contact lenses for keratoconus, post-surgical and irregular corneas.
- Orthokeratology lenses: principles and applications.
- Recent advances in contact lens materials, coatings, and drug-delivery lenses.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- EFRON N. Contact Lens Practice. 3rd ed. Elsevier; 2017.
- PHILLIPS AJ, SPEEDWELL L. Contact Lenses. 5th ed. Elsevier; 2019.
- BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Philadelphia: Elsevier; 2006.
- GASSER CE. Clinical Contact Lens Practice. Jaypee Brothers; 2015.
- BRUYNS M. Scleral Lenses: A Clinical Guide. Springer; 2020.
- AMERICAN ACADEMY OF OPHTHALMOLOGY. Contact Lens & Refractive Technologies BCSC Section. Latest ed.

Course Title: Low Vision & Rehabilitation	L	T	P	Cr
Course Code: BVO502	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Define low vision and its causes, classifications, and functional impact.
2. Demonstrate knowledge of low vision examination techniques and assessment tools.
3. Select and prescribe appropriate low vision aids for patients.
4. Explain rehabilitation strategies for patients with irreversible vision loss.
5. Counsel patients and caregivers on adaptation, assistive technologies, and community resources.

Course Contents

UNIT I (10 Hours): Introduction to Low Vision

- Definition, epidemiology, and classification of low vision.
- Common causes: macular degeneration, diabetic retinopathy, glaucoma, retinitis pigmentosa.
- Impact of low vision on quality of life and daily living.

UNIT II (10 Hours): Assessment of Low Vision

- Case history and functional vision assessment.
- Tests for distance and near visual acuity in low vision patients.
- Visual field evaluation, contrast sensitivity, and glare testing.
- Assessment of reading and mobility skills.

UNIT III (5 Hours): Low Vision Aids

- Optical devices: magnifiers, telescopes, high-plus reading lenses.
- Non-optical aids: lighting, large-print materials, contrast enhancements.
- Electronic devices: CCTV magnifiers, screen readers, mobile applications.

UNIT IV (5 Hours): Rehabilitation & Patient Management

- Principles of low vision rehabilitation.

- Orientation and mobility training.
- Counseling, vocational rehabilitation, and integration into society.
- Role of multidisciplinary team in low vision care.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *CORN AL, ERIN JN. Foundations of Low Vision: Clinical and Functional Perspectives. 2nd ed. AFB Press; 2010.*
- *JACKSON AJ, WOLFFSOHN JS. Low Vision Manual. Elsevier; 2007.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *LUXON LM. Low Vision: Principles and Management. Springer; 2015.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Vision Rehabilitation BCSC Section. Latest ed.*
- *WHITTEN JS. Clinical Management of Low Vision. 2nd ed. Lippincott Williams & Wilkins; 2004.*

Course Title: Ocular Pharmacology & Therapeutics	L	T	P	Cr
Course Code: BVO503	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the pharmacokinetics and pharmacodynamics of drugs used in eye care.
2. Describe the mechanism of action, indications, and adverse effects of commonly used ocular drugs.
3. Demonstrate knowledge of therapeutic strategies in ocular diseases.
4. Understand the rationale behind drug selection in different ocular conditions.
5. Counsel patients regarding safe drug use, dosage, and compliance.

Course Contents

UNIT I (10 Hours): Basics of Ocular Pharmacology

- General principles of pharmacology – absorption, distribution, metabolism, excretion.
- Routes of drug administration in ophthalmology (topical, systemic, intraocular, periocular).
- Drug delivery systems in ophthalmology (ointments, gels, sustained-release inserts).
- Pharmacology of autonomic drugs and their ocular applications.

UNIT II (10 Hours): Drugs for Anterior Segment Disorders

- Antimicrobial agents: antibiotics, antivirals, antifungals.
- Anti-inflammatory agents: corticosteroids and NSAIDs.
- Mydriatics and cycloplegics.
- Antiglaucoma drugs – mechanism and clinical use.

UNIT III (5 Hours): Drugs for Posterior Segment & Systemic Disorders

- Anti-VEGF agents and their use in retinal diseases.
- Drugs for uveitis and systemic immunosuppressants.
- Drugs affecting tear secretion and dry eye management.

UNIT IV (5 Hours): Therapeutics & Patient Care

- Principles of rational prescribing in ophthalmology.
- Drug toxicity, side effects, and monitoring.
- Emergencies in ocular pharmacology (e.g., anaphylaxis, acute glaucoma).
- Recent advances in ocular therapeutics.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *TRIPATHI KD. Essentials of Medical Pharmacology. 8th ed. Jaypee Brothers; 2018.*
- *WHITCHER JP, SRINIVASAN M. Ophthalmology: An Atlas & Text. Lippincott Williams & Wilkins; 2010.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2019.*
- *FLACH AJ. Ocular Therapeutics and Pharmacology. Butterworth-Heinemann; 2003.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Ocular Pharmacology BCSC Section. Latest ed.*

Course Title: Community Optometry & Public Health	L	T	P	Cr
Course Code: BVO504	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles of community eye health and public health in optometry.
2. Describe the epidemiology and prevention strategies for common causes of blindness and visual impairment.
3. Plan and participate in community-based vision screening programs.
4. Apply knowledge of national and international programs for prevention of blindness.
5. Counsel communities and individuals regarding eye health promotion and preventive eye care.

Course Contents

UNIT I (10 Hours): Introduction to Community Optometry & Public Health

- Concepts of community health, public health, and preventive ophthalmology.
- Epidemiology of blindness and visual impairment.
- Determinants of health and disease in eye care.
- Levels of prevention and health promotion strategies.

UNIT II (10 Hours): Common Eye Diseases & Preventive Strategies

- Community prevalence of refractive errors, cataract, glaucoma, diabetic retinopathy, ARMD.
- Strategies for early detection and management at community level.
- Vision screening techniques in schools, workplaces, and community camps.
- Role of optometrists in prevention of childhood blindness.

UNIT III (5 Hours): National & International Programs

- National Program for Control of Blindness and Visual Impairment (NPCBVI).

- WHO initiatives: Vision 2020 – The Right to Sight, Universal Eye Health.
- Role of NGOs and public-private partnerships in eye care delivery.

UNIT IV (5 Hours): Community-Based Optometry Practices

- Organizing and managing eye screening camps.
- Counseling for low vision, refractive error correction, and rehabilitation.
- Community participation, health education, and IEC (Information, Education, Communication) activities.
- Ethical and legal issues in community optometry.

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *JOHNSON GJ, MINASSIAN DC, WEALE R, WEST SK. Epidemiology of Eye Disease. 3rd ed. CRC Press; 2012.*
- *PARK K. Park's Textbook of Preventive and Social Medicine. 27th ed. Jabalpur: Banarsidas Bhanot; 2023.*
- *KHURANA AK. Comprehensive Ophthalmology. 7th ed. New Delhi: Jaypee Brothers; 2019.*
- *WORLD HEALTH ORGANIZATION. Universal Eye Health: A Global Action Plan 2014–2019. WHO Press.*
- *RESNIKOFF S, et al. Global Initiative for the Elimination of Avoidable Blindness. WHO; latest ed.*
- *GILBERT C, FOSTER A. Childhood Blindness in the Context of VISION 2020 — The Right to Sight. Bull World Health Org.*

Course Title: Medical Ethics & Legal Issues	L	T	P	Cr
Course Code: BVO505	3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the fundamental principles of medical ethics and their application in healthcare.
2. Understand the legal responsibilities of healthcare professionals in patient care.
3. Recognize ethical dilemmas and apply decision-making frameworks to resolve them.
4. Interpret laws and regulations related to medical negligence, consent, confidentiality, and patient rights.
5. Apply ethical and legal principles to real-world clinical cases in optometry and health care.

Course Contents

UNIT–I: Introduction to Medical Ethics & Professionalism (15 Hours)

- History and evolution of medical ethics
- Core principles: autonomy, beneficence, non-maleficence, justice
- Professional codes of conduct (Hippocratic Oath, Declaration of Geneva, MCI/NMC guidelines)
- Duties and responsibilities of healthcare providers
- Doctor–patient relationship and communication

UNIT–II: Legal Aspects in Healthcare (10 Hours)

- Overview of Indian legal system related to health
- Consent: informed consent, implied consent, proxy consent
- Confidentiality and privacy of patient records
- Medical negligence: definitions, types, and consequences
- Consumer Protection Act and implications for healthcare professionals

UNIT–III: Ethical & Legal Issues in Clinical Practice (10 Hours)

- End-of-life care and decision making (euthanasia, DNR orders)
- Organ transplantation and donation ethics
- Reproductive rights and assisted reproductive technologies
- Ethical issues in genetic testing and stem cell therapy
- Research ethics and clinical trials

UNIT–IV: Case Studies & Contemporary Issues (10 Hours)

- Case discussions on medical negligence, malpractice, and consent disputes
- Ethical issues in emerging technologies (telemedicine, AI in healthcare, digital health records)
- Public health ethics (vaccination, quarantine, resource allocation)
- Role of ethics committees and institutional review boards
- National and international laws on human rights in healthcare

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *BEAUCHAMP TL, CHILDRESS JF. Principles of Biomedical Ethics. 8th ed. Oxford University Press; 2019.*
- *INDIAN MEDICAL COUNCIL (Professional Conduct, Etiquette and Ethics) Regulations, 2002.*
- *PANDYA SK. Medical Ethics, Law and Human Rights: A South Asian Perspective. Jaypee Brothers Medical Publishers; 2013.*
- *GHAI OP. Medical Ethics and the Law. CBS Publishers; 2018.*
- *PARK K. Textbook of Preventive and Social Medicine. 27th ed. Bhanot Publishers; 2023 (Chapters on ethics & medico-legal issues).*
- *WORLD MEDICAL ASSOCIATION. WMA International Code of Medical Ethics (latest edition).*
- *SINGH J. Legal Aspects of Health Care. Paras Medical Publisher; 2017.*

Course Title: Research Methodology & Biostatistics	L	T	P	Cr
Course Code: BVO506	2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the basic concepts and significance of research in health sciences.
2. Formulate research problems, hypotheses, and objectives.
3. Apply appropriate study designs and sampling techniques.
4. Perform basic statistical analysis and interpret results correctly.
5. Critically evaluate published research and prepare a structured research proposal.

Course Contents

UNIT–I: Introduction to Research Methodology (10 Hours)

- Meaning, need, and importance of research in health sciences
- Types of research: descriptive, analytical, experimental, qualitative, quantitative, mixed methods
- Research problem identification, objectives, and hypothesis formulation
- Literature review and referencing styles (Vancouver/APA)

UNIT–II: Research Design and Methods (10 Hours)

- Study designs: observational (cross-sectional, case-control, cohort) and interventional (clinical trials, RCTs)
- Sampling methods: probability and non-probability techniques
- Sample size calculation and power analysis (basic concepts)
- Data collection methods: questionnaires, interviews, records, and tools
- Research ethics: informed consent, plagiarism, ethics committees

UNIT–III: Biostatistics – Descriptive Statistics (5 Hours)

- Data types: qualitative vs quantitative
- Data presentation: tables, charts, diagrams
- Measures of central tendency (mean, median, mode)

- Measures of variability (range, variance, standard deviation)
- Normal distribution and its applications

UNIT–IV: Biostatistics – Inferential Statistics (5 Hours)

- Basics of probability
- Hypothesis testing, p-values, confidence intervals
- Parametric tests: t-test, ANOVA
- Non-parametric tests: Chi-square, Mann–Whitney U test
- Correlation and regression (basic concepts)
- Use of statistical software (SPSS, R, or Excel basics)

Transaction Modes: Video-based teaching, Collaborative teaching, Case-based teaching, Question–Answer sessions

Suggested Readings

- *KOTHARI CR, GARG G. Research Methodology: Methods and Techniques. 4th ed. New Age International Publishers; 2019.*
- *INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR). Ethical Guidelines for Biomedical Research on Human Participants. Latest edition.*
- *SINGH J, KUMAR P. Research Methodology and Biostatistics for Health Sciences. CBS Publishers; 2018.*
- *MAHAJAN BK. Methods in Biostatistics. 8th ed. Jaypee Brothers Medical Publishers; 2016.*
- *DANIEL WW, CROSS CL. Biostatistics: A Foundation for Analysis in the Health Sciences. 10th ed. Wiley; 2013.*
- *PARK K. Textbook of Preventive and Social Medicine. 27th ed. Bhanot Publishers; 2023.*
- *WHO. Handbook on Health Research Methodology. World Health Organization; latest edition.*

Course Title: Contact Lens – II Practical	L	T	P	Cr.
Course Code: BVO507	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate advanced skills in fitting different types of contact lenses.
2. Evaluate the ocular surface and tear film for suitability of contact lens wear.
3. Perform insertion, removal, and care techniques for rigid and specialty contact lenses.
4. Assess and troubleshoot complications related to contact lens wear.
5. Apply knowledge of special lens designs in clinical practice (toric, multifocal, scleral, orthokeratology, therapeutic).

Course Content

List of Practicals / Experiments (60 Hours)

- Pre-fitting ocular examination – slit lamp evaluation, keratometry, and corneal topography.
- Diagnostic lens fitting – rigid gas permeable (RGP) lenses.
- Advanced fitting techniques for toric soft contact lenses.
- Multifocal and bifocal contact lens assessment.
- Scleral and semi-scleral lens fitting and evaluation.
- Orthokeratology lens fitting principles and clinical practice.
- Therapeutic / bandage contact lenses – indications, fitting, and aftercare.
- Evaluation of tear film, tear break-up time (TBUT), and staining techniques.
- Contact lens verification: power, base curve, and diameter using lensometers and radiuscope.
- Insertion and removal training for rigid and scleral lenses.
- Patient education: lens hygiene, disinfection, and care systems.
- Recognition and management of contact lens complications (red eye, giant papillary conjunctivitis, corneal hypoxia, staining).

- Case-based practice: complex refractive errors and irregular cornea management.
- Clinical record-keeping and contact lens prescription writing.
- Demonstration and hands-on practice with modern contact lens instruments.

Suggested Readings

- *BENJAMIN WJ. Borish's Clinical Refraction. 2nd ed. Elsevier; 2006.*
- *BENNETT ES, WEISSMAN BA. Clinical Contact Lens Practice. 2nd ed. Lippincott Williams & Wilkins; 2005.*
- *PHILLIPS AJ, SPEEDWELL L. Contact Lenses. 6th ed. Elsevier; 2019.*
- *EFRON N. Contact Lens Practice. 4th ed. Elsevier; 2020.*
- *MANDELL RB. Contact Lens Practice. 4th ed. Charles C Thomas Publisher; 2010.*
- *EFRON N. Contact Lens Complications. 4th ed. Elsevier; 2020.*
- *GASSER CE. Rigid Gas Permeable Contact Lens Fitting. Butterworth-Heinemann; latest edition.*

Course Title: Low Vision & Rehabilitation Practical	L	T	P	Cr.
Course Code: BVO508	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform comprehensive low vision assessment, including visual acuity, contrast sensitivity, and visual fields.
2. Prescribe and demonstrate the use of optical and non-optical low vision aids.
3. Train patients in the effective use of magnifiers, telescopes, and electronic devices.
4. Provide rehabilitation strategies for patients with irreversible visual impairment.
5. Maintain appropriate clinical documentation and patient counseling for low vision care.

Course Content

List of Practicals / Experiments (60 Hours)

- History taking and assessment of patients with low vision.
- Measurement of distance and near visual acuity in low vision patients.
- Assessment of contrast sensitivity and glare.
- Visual field assessment in patients with low vision.
- Trial and prescription of optical low vision devices:
  - Hand-held magnifiers
  - Stand magnifiers
  - Spectacle magnifiers
  - Telescopic systems
- Demonstration and practice of non-optical aids (reading stands, typoscopes, lighting, large print materials).
- Use of electronic low vision devices (CCTV, screen magnification software, screen readers).
- Training patients in eccentric viewing and steady eye strategies.
- Orientation and mobility training for low vision patients.

- Counseling patients and families about vocational rehabilitation and daily living aids.
- Case-based practice with patients having specific conditions (retinitis pigmentosa, AMD, albinism, diabetic retinopathy, glaucoma).
- Evaluation of functional vision for educational and occupational needs.
- Writing and maintaining clinical records for low vision rehabilitation.
- Interdisciplinary rehabilitation – role of occupational therapists, physiotherapists, and social workers.
- Practical exposure through clinical postings in low vision rehabilitation centers (where possible).

Suggested Readings

- *CORN AL, ERIN JN. Foundations of Low Vision: Clinical and Functional Perspectives. 2nd ed. AFB Press; 2010.*
- *WHITTINGTON C, WENDELL W. Low Vision Rehabilitation: A Practical Guide for Occupational Therapists. SLACK Incorporated; 2014.*
- *LUXENBERG J, GOODRICH GL. Low Vision Rehabilitation: A Guide for Health Care Professionals. Springer; 2015.*
- *LUECK AH, DUTTON GN. Vision and the Brain: Understanding Cerebral Visual Impairment in Children. AFB Press; 2015.*
- *EFRON N. Clinical Manual of Contact Lenses and Low Vision Aids. Elsevier; latest edition.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Basic and Clinical Science Course (BCSC) – Section 13: Refractive Surgery, Low Vision, and Vision Rehabilitation. Latest edition.*

Course Title: Ocular Pharmacology & Therapeutics Practical	L	T	P	Cr.
Course Code: BVO509	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate knowledge of common ophthalmic drugs, their formulations, and routes of administration.
2. Identify correct dosage forms (eye drops, ointments, gels, inserts) and demonstrate proper instillation techniques.
3. Apply aseptic precautions in the preparation and handling of ocular medications.
4. Recognize drug interactions, contraindications, and side effects in clinical practice.
5. Perform case-based therapeutic planning for common ocular conditions.

Course Content

List of Practicals / Experiments (60 Hours)

- Familiarization with ophthalmic drug formulations (solutions, suspensions, ointments, gels, inserts).
- Demonstration and practice of eye drop instillation techniques.
- Demonstration and practice of eye ointment application techniques.
- Preparation of artificial tears in laboratory settings.
- Aseptic techniques in handling ophthalmic medications.
- Preparation of stock solutions and dilutions for ocular use.
- Identification of commonly used ocular drugs (mydriatics, cycloplegics, miotics, anti-glaucoma drugs, lubricants, anti-infectives, steroids, NSAIDs).
- Use of fluorescein dye for ocular surface evaluation.
- Demonstration of diagnostic pharmacological tests (e.g., mydriasis, cycloplegia).

- Case-based practice in therapeutic drug selection for conjunctivitis, keratitis, dry eye, glaucoma, and uveitis.
- Demonstration of local anesthesia techniques (peribulbar, retrobulbar – observation only).
- Recognition and documentation of adverse drug reactions in ophthalmology.
- Study of systemic drugs with ocular side effects (antihypertensives, antituberculars, antimalarials).
- Preparation of patient counseling modules for safe drug use and compliance.
- Record keeping and prescription writing in ocular therapeutics.

Suggested Readings

- *KANSKI JJ, BOWLING B. Clinical Ophthalmology: A Systematic Approach. 9th ed. Elsevier; 2020.*
- *WHITCHER JP, SCHWAB IR. Clinical Ophthalmic Pharmacology and Therapeutics. Oxford University Press; latest edition.*
- *TRIPATHI KD. Essentials of Medical Pharmacology. 9th ed. Jaypee Brothers Medical Publishers; 2024.*
- *FLACH AJ. Ocular Therapeutics: Eye on New Discoveries. Butterworth-Heinemann; latest edition.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Basic and Clinical Science Course (BCSC) – Section 14: Pharmacology. Latest edition.*
- *GUPTA SK. Textbook of Pharmacology for Medical and Dental Students. Jaypee Brothers; latest edition.*
- *FRANGIEH GT. Ocular Pharmacology and Therapeutics: A Primer. Springer; latest edition.*

Course Title: Community Optometry & Public Health Practical	L	T	P	Cr.
Course Code: BVO510	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Conduct community-based vision screening and eye health surveys.
2. Apply principles of epidemiology to identify ocular health problems in populations.
3. Demonstrate skills in planning and implementing eye health education programs.
4. Perform vision screening for different age groups in schools and communities.
5. Collaborate with healthcare teams in outreach programs and prepare reports for public health initiatives.

Course Content

List of Practicals / Experiments (60 Hours)

- Orientation to community eye health programs.
- Planning and organizing vision screening camps.
- Vision screening techniques for preschool and school children.
- Visual acuity testing in community settings.
- Near vision assessment and presbyopia screening in adults.
- Identification of common ocular conditions in the community (cataract, refractive errors, glaucoma, diabetic retinopathy).
- Use of basic screening instruments – torchlight, ophthalmoscope, retinoscope.
- Recording and maintaining screening data in standard formats.
- Referral protocols and networking with higher centers.
- Health education methods – preparation of posters, flip charts, and IEC material.
- Conducting group discussions and health talks on preventive eye care.
- School vision screening programs – planning, execution, and reporting.

- Conducting door-to-door surveys for ocular morbidity.
- Community epidemiological exercises: prevalence and incidence calculations.
- Preparation of a community optometry project report.

Suggested Readings

- *PARK K. Textbook of Preventive and Social Medicine. 27th ed. Bhanot Publishers; 2023.*
- *JOHNSON GJ, MINASSIAN DC, WEALE R, WEST SK. Epidemiology of Eye Disease. 3rd ed. CRC Press; 2012.*
- *GILBERT C, FOSTER A. Childhood Blindness in the Context of VISION 2020 — The Right to Sight. Bull World Health Organ; 2001.*
- *KHAN J. Community Ophthalmology. Jaypee Brothers Medical Publishers; latest edition.*
- *WHO. Vision 2020: The Right to Sight – Global Initiative for the Elimination of Avoidable Blindness. World Health Organization; 2007.*
- *MURTHY GV, GUPTA SK. Public Health in Ophthalmology. CBS Publishers; latest edition.*
- *AMERICAN ACADEMY OF OPHTHALMOLOGY. Community Eye Health and Preventive Ophthalmology. Latest BCSC edition.*

Course Title: Research Methodology & Biostatistics Practical	L	T	P	Cr.
Course Code: BVO511	0	0	4	2

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Design a simple research proposal including objectives, methodology, and sample selection.
2. Collect, organize, and present research data using appropriate formats.
3. Apply descriptive and basic inferential statistical methods to analyze data.
4. Use statistical software tools (Excel/SPSS/R) for basic analysis.
5. Interpret statistical results and prepare a structured research report.

Course Content

List of Practicals / Experiments (60 Hours)

- Introduction to research design: framing research questions, aims, and objectives.
- Literature search using PubMed, Google Scholar, and other databases.
- Referencing and bibliography writing (Vancouver/APA style).
- Preparation of a research proposal (title, objectives, methodology).
- Methods of data collection – questionnaire, survey, clinical data recording.
- Classification of data – qualitative vs quantitative, continuous vs discrete.
- Data entry and coding in Excel/SPSS.
- Data presentation: tables, bar charts, pie charts, histograms, scatter plots.
- Calculation of measures of central tendency (mean, median, mode).
- Calculation of measures of dispersion (range, variance, standard deviation).
- Normal distribution demonstration and applications.

- Correlation and regression (basic exercises).
- Hypothesis testing – concept of null and alternative hypotheses.
- Parametric tests: t-test (independent, paired), one-way ANOVA.
- Non-parametric tests: Chi-square test, Mann–Whitney U test.
- Practice with statistical software – descriptive and inferential statistics.
- Preparation of mock results and interpretation of p-values, confidence intervals.
- Writing results, discussion, and conclusion for a small-scale study.
- Preparation of a research report/mini project.
- Presentation and group discussion of student projects.

Suggested Readings

- *KOTHARI CR, GARG G. Research Methodology: Methods and Techniques. 4th ed. New Age International Publishers; 2019.*
- *MAHAJAN BK. Methods in Biostatistics. 8th ed. Jaypee Brothers Medical Publishers; 2016.*
- *DANIEL WW, CROSS CL. Biostatistics: A Foundation for Analysis in the Health Sciences. 10th ed. Wiley; 2013.*
- *INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR). National Ethical Guidelines for Biomedical and Health Research Involving Human Participants. Latest edition.*
- *SINGH J, KUMAR P. Research Methodology and Biostatistics for Health Sciences. CBS Publishers; 2018.*
- *PARK K. Textbook of Preventive and Social Medicine. 27th ed. Bhanot Publishers; 2023.*
- *WHO. Handbook on Health Research Methodology. World Health Organization; latest edition.*

Semester 6th

Course Title: Internship	L	T	P	Cr
Course Code: BVO601	0	0	40	20

Total Hours 600

Learning Outcomes: After Completion of this course, the learner will be able to:

1. Assist in preparing and maintaining operation theatres, instruments, and equipment for surgical procedures.
2. Apply infection control measures, sterilization techniques, and biomedical waste management effectively.
3. Support surgeons and anesthesiologists during operations with professionalism and accuracy.
4. Demonstrate patient care skills in pre-operative, intra-operative, and post-operative settings.
5. Integrate theoretical knowledge with clinical experience to function as a competent OT technologist.

Course Contents

List of Practical's / Experiments: 600 Hours

The internship in Optometry is designed to provide students with extensive clinical exposure and practical training in eye hospitals, vision care clinics, and ophthalmology departments. Under the supervision of optometrists and ophthalmologists, students will learn to perform comprehensive eye examinations, including refraction, visual acuity testing, binocular vision assessment, contact lens fitting, and low vision evaluation. They will also gain hands-on experience in the use of ophthalmic instruments such as retinoscopes, slit lamps, keratometers, autorefractors, and tonometers. Emphasis will be placed on the detection of common ocular disorders, pre- and post-operative patient care, counseling for refractive errors, and patient education regarding preventive eye care. Students will rotate through different specialties including pediatric optometry, contact lens clinics, community eye screening camps, and low vision rehabilitation units. They are required to

maintain a logbook, prepare case reports, and submit a final internship project documenting their clinical experiences and learning.