GURU KASHI UNIVERSITY

Bachelor Voc. In Optometry

Session: 2024-25

Department of Paramedical Sciences

Program Structure

Semester -I							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	**BVO101**	General Pathology	**Core**	**4**	**0**	**0**	**4**
2	**BVO102**	Ocular Anatomy & Physiology	**Core**	**4**	**0**	**0**	**4**
3	**BVO103**	Ocular Biochemistry	**Core**	**4**	**0**	**0**	**4**
4	**BVO121**	General Pathology Practical	**Skill Based**	**0**	**0**	**4**	**2**
5	**BVO122**	Ocular Anatomy & Physiology - Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	**BVO123**	Ocular Biochemistry - Practical	**Skill Based**	**0**	**0**	**4**	**2**
7	**BVO124**	Project-I	**Research Skill**	**0**	**0**	**4**	**2**
8	**BVO104**	Communication & soft skills	**Compulsory Foundation**	**2**	**0**	**0**	**2**
Discipline Elective-I (One of following)							
9	**BVO105**	General and Ocular Biochemistry	**Discipline Elective-I**	**3**	**0**	**0**	**3**
10	**BVO110**	General Microbiology					
TOTAL				**17**	**0**	**16**	**25**

Semester -II							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	BVO201	Ocular Microbiology	**Core**	**4**	**0**	**0**	**4**
2	BVO202	Ocular Diseases- I	**Core**	**4**	**0**	**0**	**4**
3	BVO203	Optometric and Dispensing Optics –I	**Core**	**4**	**0**	**0**	**4**
4	BVO221	Ocular Microbiology- Practical	**Skill Based**	**0**	**0**	**4**	**2**
5	BVO222	Ocular Diseases- I - Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	BVO223	Optometric and Dispensing Optics –I - Practical	**Skill Based**	**0**	**0**	**4**	**2**
7	BVO224	Project-II	**Research Skill**	**0**	**0**	**4**	**2**
8	BVO299	XXXX	**MOOC**	**-**	**-**	**-**	**2**
9	BVO205	Environmental Science	Compulsory Foundation	**2**	**0**	**0**	**2**
Discipline Elective-II (One of following)							
10	BVO206	Applied Optometry & Orth optics	Discipline Elective-II	**2**	**0**	**0**	**2**
11	BVO207	Pharmacology					
TOTAL				**16**	**0**	**16**	**26**

Semester -III							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	**BVO301**	Geometrical, Physical & Visual Optics- I	**Core**	**3**	**0**	**0**	**3**
2	**BVO302**	Ocular Diseases-II	**Core**	**3**	**0**	**0**	**3**
3	**BVO303**	Optometric and Dispensing Optics- II	**Core**	**3**	**0**	**0**	**3**
4	**BVO321**	Geometrical, Physical & Visual Optics- I - Practical	**Skill Based**	**0**	**0**	**4**	**2**
5	**BVO322**	Ocular Diseases –II- Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	**BVO323**	Optometric and Dispensing Optics- II - Practical	**Skill Based**	**0**	**0**	**4**	**2**
7	**BVO324**	Project-III	**Research Skill**	**0**	**0**	**4**	**2**
8	**BVO399**	XXXX	**MOOC**	**-**	**-**	**-**	**2**
Discipline Elective-III (One of following							
9	**BVO305**	Public Health & Community Optometry	**Discipline Elective-III**	**3**	**0**	**0**	**3**
10	**BVO306**	Ocular Disease I (Anterior Segment Disease)					
Open Electives Courses (For other Departments)							

11	**BVO307**	Environment and Health	**Open Elective**	**2**	**0**	**0**	**2**
12	**BVO308**	Microbial Diseases: Causes, Prevention and Cure					
TOTAL				**14**	**0**	**16**	**24**

Semester -IV							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	BVO401	Geometrical, Physical & Visual Optics- II	**Core**	**4**	**0**	**0**	**4**
2	BVO402	Clinical Examination of Visual System	**Core**	**4**	**0**	**0**	**4**
3	BVO421	Geometrical, Physical & Visual Optics- II -Practical	**Skill Based**	**0**	**0**	**4**	**2**
4	BVO423	Clinical Examination of Visual System- Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	BVO424	Project-IV	**Research Skill**	**0**	**0**	**6**	**3**
7	BVO403	Human psychology	**Multidisciplinary**	**3**	**0**	**0**	**3**
8	BVO404	Innovation, creativity and Entrepreneurial mind set	**Entrepreneurship skills**	**0**	**0**	**4**	**2**
Discipline Elective-IV (One of following)							
9	BVO406	Low Vision Aids & Visual Rehabilitation	Discipline Elective-IV	**3**	**0**	**0**	**3**
10	BVO407	Visual Optics (Optics IV)					
TOTAL				**14**	**0**	**18**	**23**

Semester -V							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	BVO501	Binocular Vision -I	**Core**	**4**	**0**	**0**	**4**
2	BVO502	Systemic Diseases & Eyes	**Core**	**4**	**0**	**0**	**4**
3	BVO503	Optometric Instruments	**Core**	**4**	**0**	**0**	**4**
4	BVO521	Binocular Vision- I - Practical	**Skill Based**	**0**	**0**	**4**	**2**
5	BVO522	Systemic Diseases & Eyes - Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	BVO523	Optometric Instruments- Practical	**Skill Based**	**0**	**0**	**4**	**2**
7	BVO524	Project-V	**Research Skill**	**0**	**0**	**4**	**2**
8	BVO599	XXXX	**MOOC**	**-**	**-**	**-**	**2**
Discipline Elective-V (One of following)							
9	BVO504	Binocular Vision & Ocular Modality	**Discipline Elective-V**	**3**	**0**	**0**	**3**
	BVO505	Systemic Condition & the Eye					
TOTAL				**15**	**0**	**16**	**25**

Semester -VI							
Sr. No.	**Course Code**	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
1	BVO601	Binocular Vision – II	**Core**	**4**	**0**	**0**	**4**
2	BVO602	Contact Lenses	**Core**	**4**	**0**	**0**	**4**
3	BVO603	Community Ophthalmology	**Core**	**4**	**0**	**0**	**4**
4	BVO621	Binocular Vision – II-Practical	**Skill Based**	**0**	**0**	**4**	**2**
5	BVO622	Contact Lenses - Practical	**Skill Based**	**0**	**0**	**4**	**2**
6	BVO623	Community Ophthalmology-Practical	**Skill Based**	**0**	**0**	**4**	**2**
7	BVO624	Project-VI	**Research Skill**	**0**	**0**	**4**	**2**
8	BVO604	Human Psychology-II	**Multidisciplinary**	**3**	**0**	**0**	**3**
Discipline Elective-VI (One of following)							
9	BVO605	Applied clinical Optometry	**Discipline Elective-VI**	**3**	**0**	**0**	**3**
10	BVO606	Pediatric Optometry and Geriatric Optometry					
TOTAL				**18**	**0**	**16**	**26**

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]

    CA1- Surprise Test (Two best out of three) (10 Marks)

    CA2- Assignment(s) (10 Marks)

    CA3- Term paper/ Quiz/Presentation (05 Marks)

B. Attendance (05 Marks)

C. Mid Semester Test: (30 Marks)

D. End-Semester Exam: (40 Marks)

Semester: 1st

Course Title: General Pathology	L	T	P	Cr.
Course Code: BVO101	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Understanding Disease Mechanisms**: Students will be able to describe the fundamental mechanisms of disease, including inflammation, necrosis, and neoplasia, and their roles in pathology.
2. **Diagnostic Skills**: Students will develop the ability to interpret pathological findings and correlate them with clinical presentations, enhancing their diagnostic acumen.
3. **Integration of Pathophysiology**: Learners will demonstrate an understanding of how pathological processes affect organ systems and contribute to the overall disease state.

Course Contents

UNIT -I **20 Hours**

Cell injury and Cellular adaptations - Normal cell, Cell injury -types, Etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations- atrophy, hypertrophy, hyperplasia, metaplasia, Inflammation-Introduction, acute inflammation-vascular events, cellular events, Chemical mediators, chronic inflammation-general features, granulomatous inflammation, Tuberculosis, Healing, and repair - Definition, different phases of healing, Factors influencing wound healing, fracture healing. Hemodynamic disorders-Oedema, Hyperemia, congestion, hemorrhage, embolism, thrombosis, and infarction.

UNIT-II **20 Hours**

Introduction to hematology & Introduction to hematology, Anemia - introduction and classification (morphological and etiological), Iron deficiency anemia: distribution of body iron, iron absorption, Causes of iron deficiency, lab findings, megaloblastic anemia: causes, lab findings, Hemolytic anemias, Blood Cells and blood collection techniques, Hemoglobin estimation, Total leucocyte count, Differential leucocyte count, Erythrocyte sedimentation rate Peripheral blood film-staining, significance of a peripheral smear, Bleeding time, clothing time

UNIT-III **10Hours**

Urine Collection methods, Physical Examination of Urine, Chemical Examination of Urine, Microscopic Examination of Urine.

UNIT-IV **10Hours**

Grossing of tissue, Tissue processing, Section cutting, Staining- Hematoxylin & Eosin and Special Stains.

Course Title: Ocular Anatomy & Physiology	L	T	P	Cr.
Course Code: BVO102	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Structural Knowledge**: Students will be able to identify and describe the anatomy of the eye, including the various layers, structures, and their functions, such as the cornea, lens, retina, and optic nerve.
2. **Physiological Processes**: Learners will understand the physiological processes involved in vision, including light transmission, image formation, and the roles of different photoreceptors.
3. **Functional Integration**: Students will be able to explain how various anatomical components work together to support visual function and maintain ocular health.
4. **Clinical Application**: Learners will develop the ability to relate ocular anatomy and physiology to common eye disorders and diseases, enhancing their understanding of clinical practices and interventions.

Course Contents

UNIT-I **10 Hours**

Spinal cord and brain stem, Cerebellum, Cerebrum, Eye: Sclera, Cornea, Choroid, Ciliary body, Iris, Retina

UNIT-II **10Hours**

Aqueous humor, Anterior chamber, Posterior chamber, Lens, Vitreous body, Eyelids, Conjunctiva**.**

UNIT-III **20 Hours**

Eye lids and lacrimation, description of the globe, Extrinsic eyes muscles, their actions and control of their movements, Coats of the eyeball, Cornea, Aqueous

humor and vitreous: Intra ocular pressure, Iris and pupil, Crystalline lens and accommodation presbyopia, Retina – structure and functions. Vision – Pigments of the eye and photochemistry, The visual stimulus, refractive errors.

UNIT-IV **20 Hours**

Vernier acuity and principle of measurement, Visual perception, Binocular vision, stereoscopic vision, optical illusions, Visual pathway, central and cerebral connections. Color vision and color defects, Theories, and diagnostic tests, Scotopic and Photopic vision, Color vision, Mechanism of accommodation, Ocular, movements and saccades, Visual perception and adaptation.

Course Title: Ocular Biochemistry	L	T	P	Cr.
Course Code: BVO103	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Molecular Understanding of Ocular Components**: Students will be able to identify and describe the biochemical composition of various ocular tissues, including the cornea, lens, and retina, and how these components contribute to their functions.
2. **Metabolic Pathways in the Eye**: Learners will understand the key metabolic pathways involved in ocular function, including those related to energy production, nutrient transport, and the synthesis of critical biomolecules.
3. **Biochemical Basis of Diseases**: Students will be able to analyze the biochemical mechanisms underlying common ocular diseases, such as cataracts, glaucoma, and age-related macular degeneration, linking biochemical changes to clinical manifestations.
4. **Research and Innovation**: Learners will develop the skills to critically evaluate current research in ocular biochemistry, understanding its implications for developing therapeutic strategies and innovative treatments in eye care.

Course Contents

UNIT-I **10Hours**

How to do and clinical significance of KFT- Blood urea, Serum Creatinine, electrolytes, LFT-SGOT, SGPT, S. Alkaline phosphatase, S lipid profile**.**

UNIT-II **15Hours**

Formation of tears, Basic and reflex tear secretion, Layers of tear film, pH of tears and significance. General Introduction to metabolic processes affecting the eye: Glycolysis, HMP shunt, Krebs cycle, Sorbitol pathway.

UNIT-III **15Hours**

Rhodopsin & Iodopsin, Chemical nature of Rhodopsin, Visual cycle, Aqueous and Vitreous humors: Formation and drainage of aqueous humor, its composition, functions, Primary and secondary vitreous humor

UNIT-IV **20 Hours**

Biochemical composition of cornea and lens, Sources of nutrients- oxygen, Glucose, Amino acid Cataract – Due to biochemical defect of lens, Lens protein their types & characteristics, Antioxidant mechanism in the lens.

Course Title**:** Environmental Studies	L	T	P	Cr.
Course Code: BVO151	3	0	0	3

Total Hours: 45

Learning Outcomes:

1. **Interdisciplinary Understanding**: Students will be able to explain the interconnectedness of ecological, social, and economic systems and how they impact environmental sustainability.
2. **Critical Analysis of Environmental Issues**: Learners will develop the ability to critically analyze contemporary environmental challenges, such as climate change, biodiversity loss, and pollution, and assess their implications for human health and ecosystems.
3. **Sustainability Practices**: Students will be able to identify and evaluate sustainable practices and policies that promote environmental stewardship and resource management.
4. **Engagement and Advocacy**: Learners will gain the skills to engage in informed discussions and advocacy regarding environmental issues, including effective communication strategies for raising awareness and driving change in their communities.

Course Contents

UNIT-I **15Hours**

Definition, Scope, Importance, and Need for public awareness, Dams and their effects on forests and tribal people, Use and over-utilization of surface and ground water, floods, drought, Conflicts over water, Dams: Benefits and problems, Environmental effects of extracting and using mineral resources, Effects of modern agriculture, fertilizer-pesticide problems, water logging, Salinity, case studies, Renewable and non-renewable energy sources, Use of alternate energy sources. Ecosystems; concept of an ecosystem, Structure and function of an ecosystem; producers, consumers and decomposers, Energy flow in the ecosystem, Ecological

succession, Food chains, Food webs and ecological pyramids. Biodiversity and its conservation; Hot-spots of biodiversity, Threats to biodiversity, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT-II **5Hours**

Definition, causes, effects and control, Measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards, Solid waste Management; Causes, effects and control measures of urban and industrial wastes, Fireworks, their impacts and hazards, Pollution case studies.

UNIT-III **15Hours**

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, Rainwater harvesting, Watershed management, Resettlement, and rehabilitation of people; Its problems and concerns, Environmental ethics; Issues and possible solutions, Consumerism, and waste products, Environmental Legislation (Acts and Laws), Issues involved in enforcement of environmental legislation, Human Population, and the Environment, Population growth, variation among nations with case studies, Population explosion; Family Welfare Programs and Family Planning programs, Human Rights, Value Education, Women and Child Welfare.

UNIT-IV **10 Hours**

Floods, earthquake, cyclone and landslides, Man-made Disaster such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge) War & Terrorism etc. Causes, effects and practical examples for all disasters. Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication and Training in disaster management.

Course Title**:** General Pathology- Practical	L	T	P	Cr.
Course Code: BVO121	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Laboratory Techniques Proficiency**: Students will demonstrate proficiency in essential laboratory techniques, such as tissue processing, staining, and microscopic examination, to analyze pathological specimens.
2. **Interpretation of Findings**: Learners will be able to accurately interpret pathological findings from slides and specimens, correlating them with clinical scenarios and underlying disease processes.
3. **Sample Handling and Preparation**: Students will understand proper procedures for sample collection, handling, and preparation, ensuring quality control and accurate results in pathological assessments.
4. **Application of Diagnostic Tools**: Learners will develop the ability to utilize various diagnostic tools and techniques, such as immunohistochemistry and molecular diagnostics, to aid in the identification and classification of diseases.

Course Contents

List of Practical's / Experiments:

1: Introduction to General Pathology Techniques

Identification of normal vs. pathological tissues: Learn to distinguish between healthy tissues and those affected by diseases using microscopy and histological staining techniques.

2: Cellular Pathology and Inflammation

Identification of granulation tissue: Understand the formation and characteristics of granulation tissue, which plays a crucial role in the healing process, and identify it in histological samples

3: Hematopathology and Cytopathology

Interpretation of bone marrow smears: Gain skills in preparing and analyzing bone marrow smears to diagnose various hematological conditions, such as anemia and leukemia.

4: Organ-Specific Pathology

Liver pathology: cirrhosis and hepatitis: Study the histopathological features of liver diseases, including cirrhosis and hepatitis, to recognize these conditions in tissue samples.

Course Title**:** Ocular Anatomy & Physiology - Practical	L	T	P	Cr.
Course Code: BVO122	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Hands-On Identification of Ocular Structures**: Students will demonstrate the ability to accurately identify and describe the anatomical structures of the eye using models, specimens, and imaging techniques.
2. **Functional Assessment Techniques**: Learners will acquire skills in performing basic ocular function tests, such as visual acuity, refractive assessment, and pupillary reactions, to evaluate the physiological aspects of vision.
3. **Correlation of Anatomy and Function**: Students will be able to relate specific anatomical features of the eye to their physiological functions, explaining how structure informs function in various visual processes.
4. **Preparation of Ocular Specimens**: Learners will gain experience in the preparation and handling of ocular specimens for microscopic examination, including proper staining techniques to visualize different eye tissues.

Course Contents

List of Practical's / Experiments:

1: Basic Ocular Anatomy

Dissection and identification of ocular structures: Conduct dissections and identify key anatomical structures of the eye, including the cornea, lens, retina, optic nerve, and associated muscles.

2: Microscopic Anatomy

Histological examination of ocular tissues: Prepare and examine slides of various ocular tissues, such as the cornea, retina, and lens, using light microscopy to understand their microscopic anatomy.

3: Ocular Physiology

Measurement of intraocular pressure (IOP): Learn techniques for measuring intraocular pressure using tonometry to understand its role in maintaining ocular health and diagnosing conditions like glaucoma.

4: Visual Pathway and Function

Mapping the visual pathway: Trace the visual pathway from the retina to the visual cortex, and understand the physiological basis of vision, including visual field testing and understanding common visual field defects.

Course Title: Ocular Biochemistry - Practical	L	T	P	Cr.
Course Code: BVO123	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Techniques in Biochemical Analysis**: Students will demonstrate proficiency in laboratory techniques used for the analysis of ocular biochemical compounds, such as spectrophotometry, chromatography, and enzyme assays.
2. **Isolation and Characterization**: Learners will acquire skills to isolate and characterize key biomolecules from ocular tissues, such as proteins, lipids, and nucleic acids, understanding their roles in eye function.
3. **Data Interpretation**: Students will develop the ability to analyze and interpret experimental data related to ocular biochemistry, linking biochemical changes to physiological functions and ocular health.
4. **Application of Research Methods**: Learners will engage in designing and conducting experiments to investigate specific biochemical processes in the eye, fostering critical thinking and research skills relevant to ocular biochemistry.

Course Contents

List of Practical's / Experiments:

1: Introduction to Ocular Biochemistry Techniques

Protein Analysis: Techniques for protein extraction and quantification in ocular tissues using methods such as spectrophotometry and electrophoresis.

2: Enzyme Activity in Ocular Tissues

Measurement of Enzyme Activity: Assaying enzyme activity specific to ocular tissues, such as lactate dehydrogenase (LDH) and carbonic anhydrase, using spectrophotometric methods.

3: Lipid and Carbohydrate Metabolism in the Eye

Lipid Analysis: Extraction and analysis of lipids from ocular tissues, including techniques like thin-layer chromatography (TLC) and gas chromatography (GC).

4: Ocular Antioxidants and Oxidative Stress

Assessment of Antioxidant Levels: Measuring the levels of antioxidants, such as glutathione, in ocular tissues and assessing oxidative stress markers using biochemical assays

Course Title: Project I	L	T	P	Cr.
Course Code: BVO123	0	0	3	3

Total Hours: 45

Learning Outcomes:

1. **Research Skills Development**: Students will demonstrate the ability to formulate research questions, design methodologies, and conduct literature reviews, applying appropriate research techniques relevant to their project topic.
2. **Data Collection and Analysis**: Learners will gain proficiency in collecting, analyzing, and interpreting data, utilizing statistical tools and software to support their findings.
3. **Critical Thinking and Problem-Solving**: Students will develop critical thinking skills by evaluating project challenges, proposing solutions, and adapting their approaches based on ongoing results and feedback.

Course Contents

List of Project's/ Experiments:

1: Vision Screening Program for Early Detection of Refractive Errors

Objective: To conduct a vision screening camp in a community or school to identify individuals with refractive errors.

- **Tasks:**

1. Design a screening protocol and prepare the necessary tools (e.g., Snellen chart, pinhole occlude).
2. Collaborate with local authorities to organize the camp.
3. Conduct vision tests and record findings.
4. Provide basic recommendations and refer complex cases to specialists.
5. Prepare a report analyzing the prevalence of refractive errors in the screened population.

2: Survey on Awareness of Eye Health in a Local Community

Objective: To assess the level of awareness and knowledge about eye health and common eye diseases in a local community.

- **Tasks:**

1. Develop a survey questionnaire covering topics like eye hygiene, common eye conditions, and the importance of regular eye check-ups.
2. Distribute the survey to a sample population and collect responses.
3. Analyze the data to identify gaps in knowledge.
4. Create educational materials (pamphlets, posters) to address these gaps.

3: Study on the Impact of Screen Time on Visual Health in Students

- **Objective:** To investigate the effects of prolonged screen time on the visual health of students in a school or college.

- **Tasks:**

1. Design a study to collect data on screen time habits and symptoms of visual discomfort among students.
2. Conduct eye examinations to assess any correlations between screen time and visual health.
3. Analyze the findings to determine the impact of screen time.
4. Develop guidelines for healthy screen usage based on the results.
5. Present the study's findings to the school

4: Implementation of a Basic Eye Care Program in a Rural Area

- **Objective:** To implement a basic eye care program aimed at improving eye health in a rural area.
- **Tasks:**

1. Assess the current state of eye care services in the selected rural area.
2. Design a basic eye care program focusing on common issues like cataracts, refractive errors, and eye infections.
3. Train local health workers or volunteers to carry out the program.
4. Monitor the program's implementation and gather feedback.
5. Evaluate the program's effectiveness and suggest improvements.

Semester II

Course Title**:** Ocular Microbiology	L	T	P	Cr.
Course Code: BVO201	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Microbial Identification and Classification**: Students will demonstrate the ability to identify and classify various microorganisms associated with ocular infections, including bacteria, viruses, fungi, and parasites, using laboratory techniques.
2. **Understanding Pathogenesis**: Learners will understand the mechanisms by which ocular pathogens cause disease, including their modes of transmission, virulence factors, and the host's immune response.
3. **Diagnostic Techniques**: Students will develop proficiency in employing diagnostic methods, such as culture, PCR, and microscopy, to detect and characterize ocular infections effectively.
4. **Treatment and Prevention Strategies**: Learners will be able to analyze and recommend appropriate treatment and prevention strategies for ocular infections, understanding the roles of antibiotics, antivirals, and vaccines in ocular microbiology.

Course Contents

UNIT-I **15Hours**

Basics of microbiology and its importance in ocular health, Overview of ocular flora: normal vs. pathogenic, Microbial structure and classification relevant to the eye, Host-microbe interactions in the ocular environment, Immunological defenses of the eye, Diagnostic techniques in ocular microbiology.

UNIT-II **15 Hours**

Common bacterial pathogens affecting the eye (e.g., Staphylococcus, Streptococcus). Pathogenesis, clinical features, and diagnosis of bacterial conjunctivitis, Keratitis: ethology, clinical presentation, and management, Endophthalmitis: causes, symptoms, and treatment protocols, Antibiotic resistance in ocular bacteria.

UNIT-III **15 Hours**

Overview of viruses impacting ocular health (e.g., Herpes simplex, Adenovirus). Clinical features and diagnosis of viral conjunctivitis, Herpetic keratitis: pathogenesis, clinical manifestations, and treatment, Cytomegalovirus (CMV) retinitis: epidemiology and management, Antiviral therapy for ocular viral infections.

UNIT-IV **15 Hours**

Common fungal pathogens in ocular infections (e.g., Aspergillus, Candida). Pathogenesis and clinical features of fungal keratitis, Diagnostic approaches for fungal eye infections, Ocular parasitic infections: Acanthamoeba and Toxoplasma gondii. Management and treatment of parasitic eye infections.

Course Title**:** Ocular Diseases- I	L	T	P	Cr.
Course Code: BVO202	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Disease Identification**: Students will be able to identify and describe common ocular diseases and conditions, including their clinical manifestations, risk factors, and epidemiology.
2. **Pathophysiological Understanding**: Learners will demonstrate an understanding of the underlying pathophysiological mechanisms of various ocular diseases, linking structural and functional changes to clinical presentations.
3. **Diagnostic Skills**: Students will develop the ability to interpret diagnostic tests and imaging studies relevant to ocular diseases, enhancing their diagnostic acumen and clinical reasoning.
4. **Management and Treatment Options**: Learners will be able to evaluate and recommend appropriate management and treatment strategies for ocular diseases, including pharmacological, surgical, and non-surgical interventions.

Course Contents

UNIT-I **20 Hours**

Applied Anatomy, Proptosis (Classification, Causes, Investigations), Enophthalmos, Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median Facial cleft syndrome), Orbital Inflammations (Presential cellulites, Orbital cellulitis Orbital Periostitis, Cavernous sinus Thrombosis), Grave's Ophthalmopathy, Orbital tumors (Dermoid, capillary hemangioma, Optic nerve glioma), Orbital tumors, Orbital trauma, Approach to a patient with proptosis Lids: Applied Anatomy, Congenital anomalies (Ptosis,

Coloboma, Epicanthus, Distichiasis, Cryptophthalmos), Oedema of the eyelids (Inflammatory, Solid, Passive edema).

UNIT-II **15 Hours**

Applied Anatomy, Tear Film, The Dry Eye (Sjogren's Syndrome), The watering eye (Etiology, clinical evaluation), Dacryocystitis, Swelling of the Lacrimal gland (Dacryoadenitis) Conjunctiva: Applied Anatomy, Inflammations of conjunctiva (Infective conjunctivitis, bacterial, chlamydial, Viral, Allergic conjunctivitis, Granulomatous conjunctivitis), Degenerative conditions (Pinguecula, Pterygium, Concretions),Symptomatic conditions (Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration),Cysts and Tumors.

UNIT-III **15Hours**

Applied Anatomy and Physiology, Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea), Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and non-ulcerative, Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic) Degenerations (classification ions, Arcussenilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy,

UNIT-IV **10Hours**

Applied Anatomy, Classification of uveitis, Etiology, Pathology, Anterior Uveitis, Posterior Uveitis, Purulent Uveitis, Endophthalmitis, Panophthalmitis, Pars Planitis, Tumors of uveal tract(Melanoma),Episcleritis and scleritis , Clinical examination of Uveitis and Scleritis.

Course Title**: Optometric & Dispensing Optics -I**	L	T	P	Cr.
Course Code: BVO203	4	0	0	4

Total Hours: 60

Learning Outcomes:

1. **Optical Principles Understanding**: Students will demonstrate a foundational understanding of the optical principles governing vision, including refraction, lens types, and the behavior of light through various media.
2. **Dispensing Techniques**: Learners will acquire practical skills in the selection, fitting, and dispensing of optical devices, such as spectacles and contact lenses, ensuring proper alignment and comfort for patients.
3. **Ocular Measurements**: Students will be able to perform essential ocular measurements, including visual acuity tests, pupillary distance, and other parameters necessary for accurate prescription and fitting.
4. **Patient Communication**: Learners will develop effective communication skills to educate patients about their optical needs, treatment options, and the proper care and maintenance of their eyewear.

Course Contents

UNIT-I **15 Hours**

Definition and Importance of Lens Power**,** Types of Lenses**,** Lens Measurement Techniques**,** Lens Power Calculations**,** Quality Control Standards Practical Applications.

UNIT-II **15Hours**

Introduction to Ophthalmic Prisms, Prism Measurement Techniques, Prism Diopters and Calculation, Clinical Applications of Prisms, Prism Fitting and Adjustment, Quality Control and Standards

UNIT-III **10 Hours**

Lens Materials, Lens Designs, Optical Properties of Lens Materials, Features of Lenses, Lens Coatings and Treatments, Comparative Analysis of Lens.

UNIT-IV **20 Hours**

Introduction to Special Lenses**,** Types of Special Lenses**,** Optical Properties and Functions**,** Applications of Special Lenses**,** Custom Lens Design and Manufacturing**,** Challenges and Considerations

Course Title**: Ocular Microbiology – Practical**	L	T	P	Cr.
Course Code: BVO221	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Laboratory Techniques Proficiency**: Students will demonstrate proficiency in essential microbiological techniques, including culture methods, Gram staining, and sensitivity testing, specifically tailored for ocular pathogens.
2. **Isolation and Identification of Microorganisms**: Learners will acquire skills to isolate and identify various microorganisms associated with ocular infections using biochemical tests and molecular methods.
3. **Interpreting Microbial Data**: Students will develop the ability to analyze and interpret laboratory results related to ocular microbiology, understanding their implications for diagnosis and treatment of ocular diseases.
4. **Infection Control Practices**: Learners will implement appropriate infection control measures in the laboratory setting, understanding the importance of biosafety and hygiene when handling pathogenic microorganisms.

Course Contents

List of Practical's / Experiments:

1: Introduction to Ocular Microbiology Techniques

Sample Collection and Handling: Learn proper techniques for collecting and handling ocular specimens such as conjunctival swabs and corneal scrapings to ensure accurate microbiological analysis.

2: Microscopy and Staining

Gram Staining and Microscopy: Perform Gram staining on ocular samples and use microscopy to identify bacterial morphology and classify bacteria as Gram-positive or Gram-negative.

3: Culture Techniques and Identification

Culture and Sensitivity Testing: Cultivate ocular pathogens on appropriate media and conduct sensitivity testing to determine effective antimicrobial treatments**.**

4: Molecular Techniques in Ocular Microbiology

PCR and Molecular Identification: Utilize polymerase chain reaction (PCR) techniques to identify specific pathogens in ocular infections at the molecular level.

Course Title**: Ocular Diseases - I - Practical**	L	T	P	Cr.
Course Code: BVO222	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Clinical Examination Skills**: Students will demonstrate proficiency in performing comprehensive ocular examinations, including techniques for assessing visual acuity, eye movements, and anterior and posterior segment evaluation.
2. **Diagnostic Testing Proficiency**: Learners will gain hands-on experience with diagnostic tools and procedures, such as tonometry, fundus photography, and optical coherence tomography (OCT), to identify and evaluate common ocular diseases.
3. **Case Assessment and Management**: Students will develop the ability to analyze clinical cases, formulate differential diagnoses, and recommend appropriate management plans based on their findings.
4. **Patient Interaction and Communication**: Learners will enhance their skills in patient interaction, effectively communicating findings, educating patients about their conditions, and discussing treatment options in a clear and compassionate manner.

Course Contents

List of Practical's / Experiments:

1: Basic Optometric Techniques

Measurement of Visual Acuity: Practice using Snellen charts and other tools to measure and record visual acuity accurately.

2: Lens Verification and Fitting

Lensometry: Learn to use a lensometer to verify the prescription of spectacle lenses and ensure proper alignment and fitting.

3: Frame Selection and Adjustment

Frame Measurement and Adjustment: Acquire skills in selecting appropriate frames and adjusting them for a comfortable and proper fit for patients.

4: Contact Lens Handling

Contact Lens Insertion and Removal: Practice safe and hygienic techniques for the insertion, removal, and care of contact lenses.

Course Title**: Optometric & Dispensing Optics -I - Practical**	L	T	P	Cr.
Course Code: BVO223	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Understanding Optical Principles**: Students will demonstrate a solid understanding of fundamental optical principles, including the behavior of light, refraction, and the properties of various lens types used in vision correction.
2. **Dispensing Practices**: Learners will acquire practical skills in the dispensing process, including the selection, fitting, and adjustment of spectacles and contact lenses to ensure optimal visual performance and comfort for patients.
3. **Ocular Measurements**: Students will be able to accurately perform essential ocular measurements, such as visual acuity testing, pupillary distance, and keratometry, which are crucial for prescribing corrective lenses.
4. **Patient Education and Communication**: Learners will develop effective communication skills to educate patients about their optical options, proper care for eyewear, and the importance of regular eye examinations for maintaining ocular health.

Course Contents

List of Practical's / Experiments:

1: Anterior Segment Examination

Slit Lamp Biomicroscopy: Training in the use of slit lamp biomicroscopy to examine the anterior segment of the eye, including the cornea, iris, and lens.

2: Posterior Segment Examination

Fundus Examination: Techniques for examining the posterior segment of the eye, including direct and indirect ophthalmoscopy to evaluate the retina, optic disc, and macula.

3: Diagnostic Testing

Tonometry: Practice in measuring intraocular pressure using various tonomet, such as Goldmann applanation tonometry and non-contact tonometry

4: Common Ocular Diseases

Identification of Cataracts: Training in identifying different types of cataracts through clinical examination and slit lamp biomicroscopy.

Course Title**:** Project-II	L	T	P	Cr.
Course Code: BVO224	0	0	4	4

Total Hours: 60

Learning Outcomes:

1. **Advanced Research Methodology**: Students will demonstrate the ability to design and implement a comprehensive research project, applying advanced methodologies appropriate to their specific field of study.
2. **Data Analysis and Interpretation**: Learners will develop proficiency in analyzing complex data sets using appropriate statistical tools and software, drawing meaningful conclusions that contribute to their research questions.
3. **Critical Evaluation of Literature**: Students will be able to critically evaluate relevant literature, synthesizing findings to support their project objectives and situate their research within the broader academic context.
4. **Professional Presentation Skills**: Learners will effectively communicate their research findings through written reports and oral presentations, showcasing their ability to engage an audience and respond to critical questions and feedback.

Course Contents

List of Project's / Experiments:

1: Assessment of Visual Acuity in Different Age Groups

- **Objective:** To evaluate and compare visual acuity across different age groups (children, adults, elderly).
- **Tasks:**

1. Conduct visual acuity tests using Snellen charts on participants from various age groups.
2. Record and analyze the results, identifying common visual acuity issues in each age group.
3. Prepare a report on the prevalence of visual impairments and suggest corrective measures

2: Impact of Digital Device Usage on Eye Health

- **Objective:** To investigate the effects of prolonged digital device usage on eye health, particularly focusing on Computer Vision Syndrome (CVS).
- **Tasks:**

1. Survey individuals with varying levels of screen time.
2. Conduct eye examinations to assess symptoms of CVS, such as dry eyes, eye strain, and headaches.
3. Analyze the correlation between screen time and eye health, and suggest preventive measure

Semester III

Course Title: **Geometrical, Physical & Visual Optics- I**	L	T	P	Cr.
Course Code: BVO301	3	0	0	3

Total Hours: 45

Learning Outcomes:

1. **Fundamental Optical Principles**: Students will demonstrate a thorough understanding of fundamental concepts in geometrical optics, including reflection, refraction, and the laws governing light behavior through various media.
2. **Lens and Mirror Analysis**: Learners will be able to analyze and calculate the properties of lenses and mirrors, including focal length, magnification, and image formation, applying the lens and mirror equations effectively.
3. **Wave Optics Concepts**: Students will understand basic principles of physical optics, such as interference, diffraction, and polarization, and will be able to apply these concepts to explain optical phenomena.
4. **Visual Perception and Human Vision**: Learners will gain insights into the relationship between optics and visual perception, including how the eye processes light and the factors influencing visual acuity and depth perception.

Course Contents

UNIT-I **7 Hours**

Nature of light –light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; Refractive index, Wave fronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence;

Vergence at a distance, Refractive index; its dependence on wavelength, Plane mirrors –height of the mirror; rotation of the mirror, Reflection by a spherical mirror –paraxial approximation; sign convention; Imaging by concave mirror, convex mirror, Prisms; angular dispersion; Dispersive power; Abbe's number. Definition of Prism diopter, Snell's Law, Refraction at a plane surface.

UNIT-II **7 Hours**

Sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; Vergence at a distance formula; affectivity of a refracting surface, Definition of a lens as a combination of two surfaces; Different types of lens shapes. Image formation by a lens by application of vergence at a distance formula; Definitions of front and back vertex powers; equivalent power; first and second principal planes/points; Primary and secondary focal planes/points; primary and secondary focal lengths, linear magnification; angular magnification, Nodal Planes. Thin lens as a special case of thick lens; review of sign convention, Imaging by a thin convex lens; Image properties (real/virtual; erect/inverted; magnified/minified) for various object positions.

UNIT-III **7 Hours**

Optics of Ocular Structure: Cornea and aqueous, Crystalline lens, Vitreous, Schematic, and reduced eye, Measurements of Optical Constants of the Eye: Corneal curvature and thickness, Curvature of the lens and ophthal mophakometry, Axial and axis of the eye, Basic Aspect of Vision, Visual Acuity, Light and Dark Adaptation, Color Vision. Refractive anomalies and their causes: Etiology of refractive anomalies, Contributing variability and their ranges, Optical component measurements, Growth of the eye in relation to refractive errors.

UNIT-IV **7 Hours**

Electromagnetic Spectrum. Polarized light; linearly polarized light; and circularly Polarized light, Intensity of polarized light; polarizers and analyzers; Methods of producing lairized light; Brewster's angle, Birefringence; ordinary and extraordinary rays. Relationship between amplitude and intensity. Coherence; interference; constructive interference, Destructive interference; fringes; Double slits, Diffraction; diffraction by a circular aperture, Scattering; Tyndall effect.

Course Title**:** Ocular Diseases -II	L	T	P	Cr.
Course Code: BVO302	3	0	0	3

Total Hours: 45

Learning Outcomes:

1. **Advanced Disease Recognition**: Students will be able to identify and describe a range of complex ocular diseases, including their clinical features, progression, and impact on vision, building on foundational knowledge from Ocular Diseases I.
2. **Pathophysiological Mechanisms**: Learners will demonstrate an understanding of the underlying pathophysiological mechanisms associated with advanced ocular diseases, linking these mechanisms to clinical presentations and potential complications.
3. **Diagnostic and Therapeutic Approaches**: Students will develop the ability to evaluate and apply appropriate diagnostic tests and therapeutic interventions for managing advanced ocular conditions, including pharmacological and surgical options.
4. **Interdisciplinary Collaboration**: Learners will understand the importance of interdisciplinary collaboration in the management of ocular diseases, effectively communicating and coordinating care with other healthcare professionals involved in patient treatment.

Course Contents

UNIT-I **7 Hours**

Applied Anatomy, Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery), Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Virus, mycotic), Retinal Vasculitis (Eales's), Retinal Artery Occlusion (Central retinal Artery occlusion), Retinal Vein occlusion (Ischemic, Non-Ischemic, Branch retinal vein occlusion), Retinal degenerations: Retinitis Pigmentosa, Lattice degenerations

,Macular disorders: Solar retinopathy, Central serous retinopathy, cystoid macula edema, Age related macular degeneration, Retinal Detachment: Rhegmatogenous, Tractional, Exudative), Retinoblastoma, Diabetic retinopathy.

UNIT-II **7 Hours**

Applied Anatomy and Physiology, Clinical examination, Classification of cataract Congenital and Developmental cataract, Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic) Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar, Management of cataract (Non-surgical and surgical measures; Preoperative evaluation, Types of surgeries), Complications of cataract surgery, Displacement of lens: Subluxation, Displacement Lens coloboma, Lenticonus, Microsperophakia.

UNIT-III **7 Hours**

Anatomy of visual pathway, Lesions of the visual pathway, Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopia pupil, Marcus Gunn pupil, Argyll Robetson pupil, Adie's tonic pupil, Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy, Cortical blindness, Malingering, Nystagmus, Clinical examination.

UNIT-IV **7 Hours**

Applied anatomy and physiology of anterior segment, Clinical Examination, Definitions, and classification of glaucoma, Pathogenesis of glaucomatous ocular damage, Congenital, glaucoma's, Primary open angle glaucoma, Ocular hypertension, Normal Tension Glaucoma, primary angle closure glaucoma (Primary angle closure suspect, acute congestive, Chronic angle closure), Secondary Glaucoma's Management: common medications, laser intervention and surgical technique.

Course Title**:** Optometric & Dispensing Optics-II	L	T	P	Cr.
Course Code: BVO303	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Manufacture of glass, Lens materials, Lens surfacing, Principle of surface generation and glass cements, Terminology used in Lens workshop, Lens properties, Lens quality, Faults in lens material, Faults on lens surface, Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others).

UNIT-II **7 Hours**

Types and parts, Classification of spectacle frames-material, Weight, temple position, Coloration, Frame construction, selection, Size, shape, mounting and field of view of ophthalmic lenses.

UNIT-III **7 Hours**

Characteristics of tinted lenses Absorptive Glasses, Polarizing Filters, Photochromic & Reflecting filters, Safety Lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses Multifocal Lenses: Introduction, history and development, Types Bifocal lenses, Trifocal & Progressive addition lenses Reflection from spectacle lens surface & lens coatings: Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line.

UNIT-IV **7 Hours**

Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating, Miscellaneous Spectacle: Isoechoic lenses, Spectacle magnifiers, recumbent prisms, Fresnel prism & lenses, Lenticular & Aspherical lenses, High Refractive index glasses.

Course Title**: Geometrical, Physical & Visual Optics -I**	L	T	P	Cr.
Course Code: BVO321	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Ray Optics: Reflection, refraction, mirrors, lenses, and optical instruments.

UNIT-II **7 Hours**

Wave Optics: Interference, diffraction, polarization, and related phenomena.

Unit-III **7 Hours**

Eye and Vision: Anatomy of the eye, visual acuity, refractive errors, and optical corrections.

UNIT-IV **7 Hours**

Instruments: Microscopes, telescopes, spectrometers, and their applications in various fields.

Course Title**:** Ocular Diseases -II - Practical	L	T	P	Cr.
Course Code: BVO321	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Diagnostic Techniques

Practical demonstration and hands-on experience with advanced diagnostic techniques for various ocular diseases.

2: Clinical Management

Practical training in clinical management and treatment procedures for ocular diseases.

3: Surgical Procedures

Practical exposure and participation in common surgical procedures for ocular diseases.

4: Post-operative Care

Practical application of post-operative care techniques and patient management

Course Title**: Optometric & Dispensing Optics-II-Practical**	L	T	P	Cr.
Course Code: BVO323	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Lens fitting and edging

Techniques for precise fitting and edging of lenses into different frame styles.

2: Contact lens fitting

Practical skills in selecting, fitting, and evaluating various types of contact lenses.

3: Lens verification and inspection

Methods for verifying lens prescriptions and inspecting lenses for defects and accuracy..

4: Frame adjustments and repairs

Techniques for adjusting and repairing eyeglass frames to ensure proper fit and comfort.

Course Title**: Project III**	L	T	P	Cr.
Course Code: BVOP324	3	0	0	3

Total Hours: 45

Course Contents

List of Project's / Experiments:

1: Assessment of Visual Acuity in Different Age Groups

- **Objective:** To evaluate and compare visual acuity in various age groups, identifying trends and common issues.
- **Tasks:**
  1. Conduct visual acuity tests on participants from different age groups.
  2. Analyze the results to identify common vision problems associated with each age group.
  3. Prepare a report on the findings, including recommendations for vision care.

2: Impact of Digital Devices on Eye Health Among Students

- **Objective:** To study the effects of prolonged use of digital devices on eye health among students.
- **Tasks:**
  1. Survey students to gather data on their usage of digital devices.
  2. Perform eye examinations to assess common issues like eye strain, dry eyes, or myopia.
  3. Analyze the correlation between device usage and eye health and propose preventive measures.

3: Evaluation of the Effectiveness of Vision Therapy in Treating Amblyopia

- **Objective:** To assess the outcomes of vision therapy in children with amblyopia (lazy eye).
- **Tasks:**
    1. Identify patients undergoing vision therapy for amblyopia.
    2. Track progress through regular visual assessments over the course of the therapy.
    3. Compile and analyze data to evaluate the effectiveness of the therapy.

Semester IV

Course Title: **Geometrical, Physical & Visual Optics- II**	L	T	P	Cr.
Course Code: BVO401	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Far and near point of accommodation Range and amplitude of accommodation, Mechanism of accommodation, Variation of accommodation with age on, Anomalies of accommodation, Presbyopia, Hyper meropia and accommodation

UNIT-II **7 Hours**

Type, Measurement and Anomalies, Relationship between accommodation and Convergence - AC/A ratio.

UNIT-III **7 Hours**

Streak retinoscopy, Principle, Procedure, Difficulties and interpretation of findings, Transposition and spherical equivalent, Dynamic retinoscopy various methods, Radical retinoscopy and near retinoscopy, Cycloplegic refraction.

UNIT-IV **7 Hours**

Principle and fogging, Fixed astigmatic dial (Clock dial), Combination of fixed and rotator dial (Fan and J.C.C),Duo chrome test, Binocular balancing- alternate occlusion, prism dissociation, Duo chrome balance, Borish dissociated fogging, Binocular refraction-Various techniques

Course Title**:** Pharmacology	L	T	P	Cr.
Course Code: BVO402	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmaco-dynamics & factors modifying drug actions.

UNIT-II **7 Hours**

Drugs affecting papillary size and light reflex, Intraocular tension, Accommodation; General & local anisette tic Ocular Pharmacology: Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system.

UNIT-III **7 Hours**

Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedures, Anti- glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial.

UNIT-IV **7 Hours**

Drugs used in allergic, inflammatory & degenerative conditions of the eye, Y Wetting agents & tear substitutes, Ophthalmic Preservatives, Ocular Irrigating Solution, Chelating Agents.

Course Title: Clinical Examination of Visual System	L	T	P	Cr.
Course Code: BVO403	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Chief complaints, History of present, illness, h/o Past illness, Family history, Personal history, Treatment history, Visual acuity testing: Snellen's chart, Logmar chart, Decimal system Examination of muscle balance: Ductions, Versions, accommodation, convergence, diplopia charting.

UNIT-II **7 Hours**

Normal and Abnormal findings of Eyelids, conjunctiva, cornea, Iris, Pupil, Lens IOP measurement and Gonioscopy: Procedure, limitations, indications of Schiotz tonometry, applanation tonometry, NCT.

UNIT-III **7 Hours**

Principle, Procedure, Indications, Difference between direct and indirect Ophthalmoscopy Examination of Lacrimal system, Orbit: Procedure and Interpretation of lacrimal syringing, Ex ophthalmometer

UNIT-IV **7 Hours**

Automated perimeter, Amsler grid, Confrontation method, Lister perimeter Neuro-ophthalmological examination: Aesthesiometer, Ocular movement's pupillary reactions.

Course Title: Geometrical, Physical & Visual Optics- II- Practical	L	T	P	Cr.
Course Code: BVO421	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Focal Length and Optical Power Measurements

Conduct experiments to measure focal lengths of various lenses using optical benches and determine their optical powers.

2: Wave Nature of Light

Perform diffraction and interference experiments to study the wave nature of light and measure the wavelength of light using a diffraction grating

3: Refractive Indices and Dispersion

Utilize spectrometers to analyse and measure the refractive indices of different materials and study their dispersion properties

4: Polarization Experiments

Carry out polarization experiments to investigate the properties of polarized light and its applications in optical systems.

Course Title: Pharmacology - Practical	L	T	P	Cr.
Course Code: BVO422	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Drug Preparation and Compounding

Practical exercises on the preparation and compounding of various pharmaceutical formulations.

2: Dosage Formulation

Hands-on practice in creating different dosage forms such as tablets, capsules, and injections.

3: Pharmacokinetics and Pharmacodynamics

Conducting experiments to study the pharmacokinetics (absorption, distribution, metabolism, excretion) and pharmacodynamics (drug effects and mechanisms) of various drugs.

4: Drug Testing and Quality Control

Practical training in drug testing methods and quality control procedures to ensure the safety and efficacy of pharmaceutical products.

Course Title: Clinical Examination of Visual System - Practical	L	T	P	Cr.
Course Code: BVO423	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Visual Acuity Assessment

Measurement of visual acuity using Snellen, Lomar, and other charts, Assessment of near and distance vision.

2: Ocular Motility and Alignment

Evaluation of eye movements including saccades, pursuits, and convergence, testing for strabismus and evaluating binocular vision.

3: Anterior Segment Examination

Examination of the cornea, lens, and iris using a slit-lamp, Evaluation of the anterior chamber depth and checking for any abnormalities.

4: Posterior Segment Examination

Examination of the retina and vitreous using direct and indirect ophthalmoscopy, Assessment of the optic nerve head and retinal vessels.

Course Title: Project IV	L	T	P	Cr.
Course Code: BVO424	3	0	0	3

Total Hours: 45

Course Contents

List of Project's / Experiments:

1: Development of a Patient Education Program on Eye Diseases

- **Objective:** Create a comprehensive educational program to inform patients about common eye diseases, their symptoms, prevention, and treatment options.
- **Tasks:**
  1. Research and compile information on common eye diseases.
  2. Develop educational materials such as brochures, posters, and presentations.
  3. Design and conduct workshops or seminars for patients.
  4. Evaluate the effectiveness of the program through feedback and assessments.

2: Design and Implementation of a Vision Screening Tool for Schools

- **Objective:** Develop a vision screening tool tailored for use in schools to identify students with potential vision issues.
- **Tasks:**
  1. Research existing vision screening methods and tools.
  2. Develop a vision screening tool or modify an existing one for school settings.
  3. Pilot tests the tool in a few schools and collect data.
  4. Analyze the results and make recommendations for widespread implementation.

3: Assessment of the Impact of Digital Devices on Visual Health

- **Objective:** Investigate how the use of digital devices affects visual health and develop guidelines to mitigate any negative effects.
- **Tasks:**
    1. Conduct a literature review on the impact of digital devices on eye health.
    2. Design and administer surveys or interviews to gather data from individuals using digital devices.
    3. Analyze the data to identify common issues and trends.
    4. Develop guidelines or recommendations to reduce digital eye strain.

Semester V

Course Title**:** Binocular Vision -I	L	T	P	Cr.
Course Code: BVO501	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Relative subjective visual direction, Retino motor value, Grades of BSV, SMP and Cyclopean Eye, Retinal Correspondence, Fusion, Diplopia, Retinal rivalry, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV, Stereopsis and monocular clues - significance, Egocentric location, clinical applications, Theories of Binocular vision.

UNIT-II **7 Hours**

Overview and Classification of Extraocular Muscles, Muscle Attachments and Actions, Physiology and Neural Control of Ocular Movements, Clinical Correlations and Related Disorders.

UNIT-III **7 Hours**

Center of rotation, Axes of Fick, Action of individual muscle, Laws of ocular motility, Dander's and Listing's law, Sherrington's law, Hering's law, Uniocular & Binocular movements - fixation, saccadic & pursuits, Version & Vergence, Fixation & field of fixation Near Vision Complex Accommodation: Definition and mechanism (process), Methods of measurement, innervation, Types of accommodation, Anomalies of accommodation – etiology and management.

UNIT-IV **7 Hours**

Definition and mechanism, Methods of measurement, Types and components of convergence - Tonic, Accommodative, fusional, proximal, Anomalies of Convergence – etiology and management, Sensory adaptation Confusion, Suppression, Investigations, Management, Blind spot syndrome, Abnormal retinal Correspondence, Eccentric Fixation.

Course Title**: Systemic Diseases & Eyes**	L	T	P	Cr.
Course Code: BVO502	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Definition, classification, Epidemiology, clinical examination, Complications, and management. Hypertensive retinopathy Diabetes Mellitus: Pathophysiology, clinical presentations, diagnosis, and management, Complications, Diabetic Retinopathy Thyroid Disease: Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors, Grave's Ophthalmopathy.

UNIT-II **7 Hours**

Congestive heart failure, Disorders of cardiac rhythm, Ophthalmic considerations. Cancer: Incidence, Etiology, Therapy, Ophthalmologic considerations Connective Tissue Disease: Rheumatic arthritis, Eye, and connective tissue disease.

UNIT-III **7 Hours**

Etiology, pathology, clinical features, Pulmonary tuberculosis, diagnosis, complications, Treatment tuberculosis and the eye. Herpes virus (Herpes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus) Herpes and the eye, Hepatitis (Hepatitis A, B, C) Acquired Immunodeficiency Syndrome Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations).

UNIT-IV **7 Hours**

Malaria, Typhoid, Dengue, Filariases, onchocerciasis, Cysticercosis, Leprosy, Nutritional Metabolic disorders: Obesity, Hyperlipidemia, Kwashiorkor Vitamin A Deficiency, Vitamin D Deficiency, Vitamin E Deficiency, Vitamin K Deficiency, Vitamin B1, B2, Deficiency, Vitamin C Deficiency Myasthenia Gravis.

Course Title**:** Optometric Instruments	L	T	P	Cr.
Course Code: BVO503	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Different types of Visual Acuity chart/drum, Retinoscope, Trial Box, Jackson Cross cylinder, Lensometer.

UNIT-II **7 Hours**

Slit lamp Ophthalmoscopy (+90, 78 D), Gonioscope, Tonometer: Applanation, Tonometer, Non- Contact Tonometer, Keratometry, and Brightness acuity test.

UNIT-III **7 Hours**

Perimeter, Electro - diagnostic instrument (ERG, VEP, EOG), A Scan & B Scan Ultrasound, Abberometer, Laser interferometry, Test for Dry Eye, Lacrimal Syringing Test.

UNIT-IV **7 Hours**

Color Vision Testing Devices, Synanthrope, Direct ophthalmoscope, Indirect Ophthalmoscope, Fundus Fluorescein Angiography, Specular Microscopy.

Course Title**:** Binocular Vision -I – Practical	L	T	P	Cr.
Course Code: BVO521	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Binocular Vision Assessment

Perform and analyze various tests to assess binocular vision, including cover test, near point of convergence, and stereopsis evaluation.

2: Visual Acuity and Binocular Function

Measure and interpret visual acuity under binocular conditions, including assessing the impact of binocular vision on visual performance.

3: Binocular Vision Disorders

Identify and document common binocular vision disorders through practical examination and case studies.

4: Clinical Management

Develop and implement treatment plans for binocular vision disorders based on practical assessments and patient needs.

Course Title**:** Binocular Vision -I – Practical	L	T	P	Cr.
Course Code: BVO521	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Introduction to Systemic Diseases

Overview of Common Systemic Diseases and Their Impact on Ocular Health

2: Clinical Examination Techniques

Practical Skills in Assessing the Impact of Systemic Diseases on the Eyes.

3: Case Studies and Diagnosis

Diagnosis and Management of Ocular Manifestations of Systemic Diseases through Case Studies.

4: Treatment and Follow-Up

Developing Treatment Plans and Follow-Up Protocols for Patients with Systemic Diseases Affecting the Eyes

Course Title**:** Systemic Diseases & Eyes - Practical	L	T	P	Cr.
Course Code: BVO522	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Introduction to Systemic Diseases and Their Impact on Ocular Health

Practical identification and analysis of systemic diseases affecting ocular health through case studies and diagnostic tools.

2: Diagnostic Techniques for Systemic Diseases

Hands-on practice with diagnostic equipment and techniques used to assess ocular complications associated with systemic diseases.

3: Management and Treatment of Ocular Manifestations of Systemic Diseases

Practical sessions on developing management plans and treatment strategies for ocular conditions resulting from systemic diseases.

4: Case Studies and Clinical Scenarios

Evaluation and discussion of real-world case studies involving systemic diseases with ocular implications, focusing on clinical decision-making and patient care.

Course Title**:** Optometric Instruments - Practical	L	T	P	Cr.
Course Code: BVO523	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Introduction to Optometric Instruments

Practical handling and calibration of basic optometric instruments (e.g., autorefractors, keratometry).

2: Visual Acuity Measurement

Accurate measurement and interpretation of visual acuity using various visual acuity charts and instruments.

3: Refractive Error Assessment

Practical application of phoropters and lensometers for determining refractive errors.

4: Scenarios Binocular Vision Testing

Conducting and analyzing binocular vision tests using instruments like synoptophore and stereotest devices

Course Title**:** Project V	L	T	P	Cr.
Course Code: BVO524	3	0	0	3

Total Hours: 45

Course Contents

List of Project's / Experiments:

1: Development of an Educational Workshop on Advanced Contact Lens Fitting

- **Objective:** To create and deliver a comprehensive workshop for optometry professionals on advanced techniques and technologies in contact lens fitting.
- **Tasks:**
    1. Research current advancements in contact lens technology.
    2. Develop detailed presentation and workshop materials.
    3. Organize and conduct a workshop, including practical demonstrations.
    4. Gather feedback from participants to assess effectiveness and areas for improvement.

2: Evaluation of Visual Rehabilitation Techniques for Low Vision Patients

- **Objective:** To evaluate and compare various visual rehabilitation techniques used for patients with low vision.
- **Tasks:**
    1. Review literature on visual rehabilitation methods.
    2. Design and conduct a study involving different rehabilitation techniques.
    3. Collect and analyze data on patient outcomes and satisfaction.

4. Prepare a report with recommendations based on the findings

3: Assessment of the Impact of Digital Devices on Eye Health in Different Age Groups

- **Objective:** To assess the impact of prolonged use of digital devices on eye health and visual performance across different age groups.
- **Tasks:**

  SSDesign a survey to collect data on digital device usage and eye health symptoms. Conduct the survey among various age groups.

  2. Analyze the data to identify trends and potential risks.

  3. Present findings and propose strategies for mitigating adverse effects

Semester VI

Course Title**:** Binocular Vision - II	L	T	P	Cr.
Course Code: BVO601	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Classification and etiological factors, History – recording and significance,Convergent strabismus,

Accommodative convergent squint: Classification, Investigation and Management

Non accommodative Convergent squint: Classification, Investigation and Management.

UNIT-II **7 Hours**

A & V phenomenon, Divergent Strabismus; Classification, Investigation and Management, Investigations, History and symptoms.

UNIT-III **7 Hours**

Paralytic Strabismus: **a**cquired and Congenital, Clinical Characteristics, Distinction from comitant and restrictive Squint Head Posture, Non-surgical Management of Squint, Amblyopia and Treatment of Amblyopia, Nystagmus.

UNIT-IV **7 Hours**

Features, Musculo-farcical anomalies, Duane's Retraction syndrome, Clinical features and management, Brown's Superior oblique sheath syndrome,Strabismus fixes.

Course Title**:** Contact Lenses	L	T	P	Cr.
Course Code: BVO602	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Definition, Classification / Types Optics of Contact Lenses: Magnification & Visual field, Accommodation & Convergence, Back & Front Vertex Power / Vertex distance calculation.

UNIT-II **7 Hours**

Review of Anatomy & Physiology of Tear film Cornea, Lids & Conjunctiva. Introduction to CL materials Monomers, Polymers, Properties of CL materials, Physiological (D K, Iconicity, Water content), Physical (Elasticity, Tensile strength, Rigidity), Optical (Transmission, Refractive index), Indications and contraindications.

UNIT-III **7 Hours**

Parameters / Designs of Contact Lenses & Terminology RGP Contact Lens materials: Manufacturing Rigid and Soft, Contact Lenses – various methods Pre-Fitting examination – steps, significance, recording of results, Correction of Astigmatism with RGP lens, Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses, Types of fit – Steep, Flat, Optimum – on Tonic cornea with spherical lenses, Calculation and finalizing Contact lens parameters, Ordering Rigid Contact Lenses – writing a prescription to the Laboratory Modifications possible with Rigid lenses, Common, Handling Instructions, Insertion & Removal Techniques.

UNIT-IV **7 Hours**

Care and Maintenance of Rigid lenses, cleaning agents & Importance, Rinsing agents & Importance, Disinfecting agents & importance, Lubricating & Enzymatic cleaners, Follow up visit examination, Complications of RGP lenses.

Course Title**: Community Ophthalmology**	L	T	P	Cr.
Course Code: BVO603	3	0	0	3

Total Hours: 45

Course Contents

UNIT-I **7 Hours**

Concepts and implementation, Stages of diseases, Dimensions, determinants and indicators of health, Levels of disease prevention and levels of health care patterns, Epidemiology of blindness – Defining blindness and visual impairment.

UNIT-II **7 Hours**

Eye in primary health care, Community Eye Care Programs, Community based rehabilitation programs, Nutritional Blindness with reference to Vitamin A deficiency, Vision 2020: The Right to Sight.

UNIT-III **7 Hours**

Screening for eye diseases, National and International health agencies, NPCB, Role of an optometrist in Public Health, Evaluation and assessment of health Programmers.

UNIT-IV **7 Hours**

Optometrists' role in school eye health programmers, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs Eye Bank: Publicity, how to donate your eyes, Collection of eyes, Preservation of eyes, Preoperative Instructions, Post-operative Instructions, Latest techniques for preservation of donor Cornea.

Course Title**:** Binocular Vision -II -Practical	L	T	P	Cr.
Course Code: BVO621	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Assessment Techniques

Perform and interpret clinical tests for binocular vision, including cover test, prism cover test, and vergence testing.

2: Diagnosis and Analysis

Diagnose and analyze binocular vision disorders using specialized instruments and diagnostic criteria.

3: Therapeutic Interventions

Apply therapeutic interventions for binocular vision disorders, such as vision therapy exercises and prism adaptation.

4: Case Studies and Practical Application

Evaluate case studies to apply practical knowledge in real-world scenarios, including treatment planning and follow-up assessments.

Course Title**:** Contact Lenses - Practical	L	T	P	Cr.
Course Code: BVO622	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Assessment Techniques

Practical demonstration of different types of contact lenses (soft, rigid gas permeable, hybrid) and their materials.

2: Diagnosis and Analysis

Hands-on practice in measuring and fitting contact lenses to different eye shapes and sizes using various fitting techniques and tools.

3: Therapeutic Interventions

Practical training on proper cleaning, disinfection, and storage methods for contact lenses, including troubleshooting common issues.

4: Case Studies and Practical Application

Simulation of common problems encountered with contact lenses and practical solutions, including dealing with discomfort and ensuring proper lens hygiene.

Course Title**:** Community Ophthalmology - Practical	L	T	P	Cr.
Course Code: BVO623	3	0	0	3

Total Hours: 45

Course Contents

List of Practical's / Experiments:

1: Community Ophthalmology Principles

Conduct practical assessments of community health needs and the implementation ofophthalmic interventions.

2: Eye Health Screening and Assessment

Perform comprehensive eye health screenings and assessments in a community setting

3: Preventive Ophthalmology

Execute practical strategies for preventive eye care and education in community outreach programs.

4: Ophthalmic Care Coordination

Manage and coordinate ophthalmic care services and referral systems within a community health framework.

Course Title**:** Project - VI	L	T	P	Cr.
Course Code: BVO624	3	0	0	3

Total Hours: 45

Course Contents

List of Project's / Experiments:

1: Development of a Comprehensive Patient Care Plan for Low Vision Patients

- **Objective:** Create a detailed patient care plan for individuals with low vision, incorporating assessment, rehabilitation, and support strategies.
- **Tasks:**
    1. Conduct research on current low vision aids and rehabilitation techniques.
    2. Develop a standardized assessment protocol for evaluating low vision patients.
    3. Design personalized care plans including recommended aids, exercises, and lifestyle adjustments.
    4. Create educational materials for patients and caregivers.

2: Evaluation of Emerging Technologies in Optometry for Enhanced Patient Outcomes

- **Objective:** Investigate and assess new technologies and tools in optometry and their impact on patient outcomes.
- **Tasks:**
    1. Review recent advancements in optometric technology (e.g., digital eye exams, advanced diagnostic tools).
    2. Conduct a comparative analysis of traditional vs. emerging technologies.
    3. Implement a pilot study using new technology with a sample of

patients.

4. Analyze the effectiveness and patient satisfaction with these technologies.

3: Analysis of the Effectiveness of Preventive Eye Care Programs in Community Settings

- **Objective:** Evaluate the effectiveness of preventive eye care programs implemented in various community settings.
- **Tasks:**
    1. Identify and document existing community-based eye care programs.
    2. Design a survey or assessment tool to measure program outcomes.
    3. Collect and analyze data from participants in different programs.
    4. Develop recommendations for improving program effectiveness based on findings.