

# **THIRD YEAR BSC OPTOMETRY SYLLABUS**

**Contact lens**

**Systemic & Ocular Disease**

**Low vision Aids & Geriatric Optometry**

**Community optometry, Eye Banking & OT Management**

**Advanced Orthoptics, Binocular Vision and Pediatric  
Optometry.**

**Research Methodology**

## Contact lens

<b>SLNO</b>	<b>TOPIC</b>	<b>HOURS</b>
1.	1.1..Introduction to CL( Defination /Types) 1.2 History of Contact Lens 1.3 Review of Ocular Anatomy & Physiology A. Lids B. Tearfilm C. Lacrimal Apparatus D. Cornea E. Conjunctiva	6
2.	2.1.Glossary of terms – Contact lenses 2.2. Optics Of Contact Lens A. Magnification & Visual Field B. Accommodation & Convergence C. Back/Front Vertex Power ( Vertex Distance Calculation) D. Axial & Refractive Ammetropia 2.3 Contact Lens materials A. Monomer/Polymer B. Properties of CL Material ( RGP& SCL) 2.4 Manufacturing of CL ( RGP,SCL& SOFT TORIC) 2.5.Indications & Contraindications	12
3.	3.1. Contact Lens Design & Parameters	8

	<p>A. RGP contact lens design</p> <p>B. Soft Contact lens design</p> <p>3.2 Preliminary Examination</p> <p>A. Instruments &amp; Its use in Contact Lens Practice(Pachymeter/Specular Microscopy/ Keratometer/Placido Disc /Corneal Topography, Slit Lamp Biomicroscope)</p> <p>B. Steps of Preliminary Examination</p> <p>C. Significance of each steps</p> <p>3.3 Parameter Selection (Base Curve/ Diameter)</p> <p>3.4.Fitting philosophies</p>	
4.	<p>4.1 Types of CL</p> <p>A. Soft Contact Lens(SCL)</p> <p>B. Soft toric Contact Lens( SOFT TORIC)</p> <p>C. Rigid gas Permeable Contact Lens( RGP)</p> <p>Indication, Parameter selection,Modification,Fitting assessment &amp; Recording,</p> <p>Final Prescription, Dispensing &amp; Follow up Visit with Examination for each type of CL</p> <p>4.2 Fitting in astigmatism – Toric CL</p> <p>A. Stabilization Technique</p> <p>4.3 Handling Of Contact Lens ( RGP/SCL/SOFT TORIC)</p> <p>A .Insertion &amp; Removal ( RGP/SCL/SOFT Toric)</p> <p>B..Do's &amp; Don'ts</p>	10

5.	<p>5.1.Wearing Modalities/Replacement Schedule</p> <p>5.2 Care &amp; Maintenance ( RGP/SCL)</p> <p>A. Cleaning Agent &amp; Importance</p> <p>B. Rinsing agent &amp; Importance</p> <p>C. Disinfecting Agent &amp; Importance</p> <p>D. Lubricating &amp; Enzymatic Action</p> <p>5.2 Lens care and hygiene, instructions, compliance</p> <p>5.3.Contact Lens solutions</p> <p>5.4 Care of contact lenses</p>	7
6.	<p>6.1 Contact Lens Deposits ( RGP/SCL)</p> <p>6.2 Complication of contact lens ( RGP /SCL)</p>	6
7.	<p>7.1 Speciality Contact Lens</p> <p>A. Therapeutic Contact Lens ( Indication / Fitting Assessment)</p> <p>B. Pediatric Contact Lens Fitting ( Aphakia &amp; Pseudophakia)</p> <p>C. Post Refractive Surgery</p> <p>D. Fitting in irregular astigmatism – Keratoconus/PMD etc</p> <p>E. Contact lenses for special purposes – Swimming, sports, occupational etc</p> <p>F. Orthokeratology</p> <p>7.2 Bifocal Contact Lens ( Types/Indication/Fitting assessment)</p>	7
8.	<p>8.1.Modifications of finished CL</p> <p>8.2.Inspection &amp; Verification of finished contact lenses</p>	02
9.	Review of Contact lenses & Solutions available in India	01
10.	10.1. Recent developments in contact lenses	01

	10.2 . Current contact lens research.	
11.		

## **RECOMMENDED BOOK**

1. IACLE – Contact Lens modules International Association of Contact Lens Educators, Sydney, Australia
2. Manual of Contact Lens prescribing & Fitting Milton.M.Hom – 3rd edition
3. Manual of Gas Permeable contact Lens Edward.S.Bennet, Milton.M.Hom – 2nd edition
4. Clinical manual of specialized CL prescribing Terry.R.Scheid
5. Clinical Contact Lens Practice Edward.s.Bennet, Barry.A.weissman
6. Cosmetic Contact Lens & Artificial eyes Devendra Kumar & Gopal Krishnan
7. Common Contact Lens Complications Lyndon.W.Jones, Deborah.A.Jones
8. Anterior segment Complication of CL wear Joel Silbert – 2nd edition
9. Contact lens practice Natrhan Effron

## OCULAR & SYSTEMIC DISEASE

### OCULAR DISEASES

<b>SLN O</b>	<b>TOPIC</b>	<b>HOU R</b>
1.	EYELIDS  1.1 Eye lid anatomy review  1.2 Congenital anomalies  Blepharophimosis, Epicanthus, Cryptophthalmos, Coloboma, Hemangioma  1.3 Acquired disorders  External and Internal hordeolum, Chalazion, Lid oedema, Blepharitis,  Blepharospasm  1.4 Eyelid tumours  Evaluation, Benign lesions, Malignant tumours  1.5 Malpositioning disorders	05

	<p>Ectropion, Entropion, Trichiasis, Distichiasis, Symblepharon, Ankyloblepharon,</p> <p>Eyelid retraction, Lagophthalmos, Poliosis, Madarosis</p> <p>1.6 Ptosis</p> <p>Classification, Clinical evaluation and Management</p> <p>1.7 Eyelid trauma</p>	
2.	<p>LACRIMAL SYSTEM</p> <p>2.1 Lacrimal anatomy review</p> <p>2.2 Methods of Lacrimal evaluation</p> <p>2.3 Congenital and developmental anomalies</p> <p>2.4 Infections of lacrimal system</p> <p>2.5 Tumours of lacrimal system</p> <p>2.6 Lacrimal trauma</p> <p>2.7 Dry eye and Watering</p> <p>Etiology , Clinical evaluation and Management</p>	06
3.	<p>ORBIT</p> <p>3.1 Orbital anatomy</p> <p>3.2 Evaluation of orbital disorders</p> <p>3.3 Congenital and developmental anomalies of orbit</p> <p>Anophthalmos, Microphthalmos, Nanophthalmos, Cryptophthalmos, Hypertelorism,</p> <p>Craniofacial anomalies, Craniosynostosis</p> <p>3.4 Orbital tumours</p> <p>Dermoids, Hemangiomas, Rhabdomyosarcoma, Optic nerve glioma, Meningiomas,</p>	04

	<p>3.5 Orbital inflammations</p> <p>Preseptal cellulitis,Orbital cellulitis,Orbital periostitis,Cavernous sinus thrombosis,</p> <p>Sinus related disorders</p> <p>3.7 Orbital trauma</p> <p>Blow out fractures</p> <p>3.8 Proptosis</p> <p>Etiology, Classifications, clinical evaluation and Management</p> <p>3.9 Graves Ophthalmopathy</p> <p>Etiology, Examination, and Management</p> <p>3.10 Enophthalmos</p> <p>Etiology, Evaluation and Management</p>	
4.	<p>Preseptal cellulitis,Orbital cellulitis,Orbital periostitis,Cavernous sinus thrombosis,</p> <p>Sinus related disorders</p> <p>3.7 Orbital trauma</p> <p>Blow out fractures</p> <p>3.8 Proptosis</p> <p>Etiology, Classifications, clinical evaluation and Management</p> <p>3.9 Graves Ophthalmopathy</p> <p>Etiology, Examination, and Management</p> <p>3.10 Enophthalmos</p> <p>Etiology, Evaluation and Management</p>	02
5.	CONJUNCTIVA and CORNEA	06



<p>5.1 Anatomy review</p> <p>A) Conjunctiva</p> <p>5.2 Examination techniques</p> <p>5.3 Inflammations of Conjunctiva</p> <p>Conjunctivitis (classification, etiology, evaluation and management)</p> <p>5.4 Degenerative conditions</p> <p>Pinguecula, Pterygium, Concretions</p> <p>5.5 Symptomatic conditions</p> <p>Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration, Papillae, Follicles,</p> <p>Hemorrhage</p> <p>5.6 Cysts and tumours</p> <p>B) Cornea</p> <p>5.7 Congenital anomalies</p> <p>Megalocornea, Microcornea, Cornea plana, Cloudy cornea</p> <p>5.8 Corneal Dystrophies</p> <p>Classifications, evaluation and management</p> <p>5.9 Corneal degenerations</p> <p>Arcus senilis, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy,</p> <p>Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal</p> <p>Degeneration, Corneal guttata</p> <p>5.10 Keratoconus and Keratoglobus</p> <p>(Etiology, Classifications, Clinical evaluation and Management)</p>	
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	<p>5.11 Corneal inflammations</p> <ul style="list-style-type: none"> <li>✓ Keratitis/Ulcer(Etiology, Classifications, Evaluation and Management)</li> <li>✓ Corneal oedema</li> <li>✓ Corneal opacity and neovascularization</li> </ul> <p>5.12 Miscellaneous ocular surface disorders</p> <ul style="list-style-type: none"> <li>✓ Keratoconjunctivitis Sicca</li> <li>✓ Steven Johnson Syndrome</li> <li>✓ Benign Mucosal Pemphigoid- ocular pemphigoid</li> <li>✓ Vitamin A deficiency</li> <li>✓ Trauma and burns</li> <li>✓ Metabolic diseases associated with corneal changes</li> </ul> <p>5.13 Corneal surgeries</p> <ul style="list-style-type: none"> <li>✓ Keratoplasty</li> <li>✓ Refractive surgeries</li> </ul> <p>5.14 Slit lamp colour coding</p>	
6	<p>LENS</p> <p>6.1 Normal lens anatomy, physiology and aging process</p> <p>6.2 Congenital and Developmental defects</p> <p>Aphakia,Lenticonus,Lentiglobus, Coloboma,Peters anomaly, Microspherophakia,</p> <p>Cataract</p> <p>6.3 Acquired lenticular defects</p> <p>Morphological cataract</p>	06

	<p>Drug induced cataract</p> <p>Traumatic cataract</p> <p>Metabolic cataract</p> <p>Complicated cataract</p> <p>Association with other ocular disorders and syndromes</p> <p>6.4 Cataract Management</p> <p>Surgical and non-surgical management</p> <p>Pre-operative evaluation</p> <p>Complications of cataract surgery</p> <p>6.5 Lens displacement</p> <p>Lens subluxation and dislocation</p>	
<p>7.</p>	<p>UVEA AND PUPIL</p> <p>7.1 Congenital anomalies</p> <p>Heterochromia, Aniridia, Coloboma, Correctopia, Polycoria, Pupillary membrane</p> <p>7.2 Inflammations of Uvea</p> <p>Classification of uveitis</p> <p>Etiology and pathogenesis</p> <p>Clinical approach to uveitis</p> <p>Endophthalmitis and panophthalmitis</p> <p>Complications of uveitis</p> <p>Ocular involvement in AIDS</p> <p>7.3 Tumours of uvea</p> <p>7.4 Anomalies of pupillary reactions</p>	<p>06</p>

<p>8.</p>	<p>VITREOUS</p> <p>8.1 Developmental abnormalities</p> <p>Hereditary hyaloidoretinopathies</p> <p>Persistent hyperplastic primary vitreous</p> <p>8.2 Vitreous opacities</p> <p>Asteroid hyalosis</p> <p>Cholesterolosis</p> <p>Pigment granules in vitreous</p> <p>Vitreous haemorrhage</p> <p>8.3 Posterior vitreous detachment</p> <p>Etiology , Clinical features and Management</p> <p>8.4 Trauma and vitreous</p> <p>8.5 Inflammations and vitreous</p> <p>8.6 Parasitic infestations</p> <p>8.7 Vitreous complications secondary to surgery</p>	<p>02</p>
<p>9.</p>	<p>RETINA</p> <p>9.1 Applied anatomy</p> <p>9.2 Congenital and developmental anomalies</p> <p>Optic disc coloboma, Drusen, Hypoplasia, Medullated nerve fibers</p> <p>9.3 Retinopathy of prematurity</p> <p>Etiology, Stages , Clinical features and Management</p> <p>9.4 Retinal vascular diseases</p> <p>Diabetic retinopathy</p> <p>Associated with cardiovascular disease</p>	<p>07</p>

<ul style="list-style-type: none"><li>✓ Hypertensive retinopathy</li><li>✓ Retinal artery and vein occlusions</li></ul> <p>9.5 Retinal Inflammations</p> <p>Retinitis, Retinal vasculitis</p> <p>9.6 Retinal degenerations</p> <p>Retinitis pigmentosa, Lattice degenerations</p> <p>9.7 Macular disorders</p> <p>Hereditary diseases</p> <p>Central serous retinopathy</p> <p>Cystoid macular oedema</p> <p>Solar retinopathy</p> <p>Albinism</p> <p>Age related macular degeneration</p> <p>Macular holes</p> <p>9.8 Retinal detachment and Retinoschisis</p> <p>Etiology, Classifications, Clinical features and management</p> <p>9.9 Retinal tumours</p> <ul style="list-style-type: none"><li>✓ Retinoblastoma</li><li>✓ Retinal and optic nerve head astrocytomas</li><li>✓ Lymphoid tumour</li></ul> <p>9.11 Miscellaneous disorders</p> <p>Epiretinal membranes</p> <p>Intraocular foreign bodies</p> <p>Other metabolic disorders of retina</p>	
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	<p>Diseases of choroidal vasculature and Bruch’s membrane</p> <p>Diseases of retinal pigment epithelium</p> <p>9.11 Fundus Drawing –colour coding</p>	
10.	<p>NEURO OPHTHALMOLOGY</p> <p>10.1 Applied anatomy review</p> <p>10.2 Neuro ophthalmic examination</p> <ul style="list-style-type: none"> <li>✓ History</li> <li>✓ Visual acuity</li> <li>✓ Colour vision</li> <li>✓ Pupillary evaluation</li> <li>✓ Ocular motility</li> <li>✓ Fundus examination</li> <li>✓ Visual field examination</li> <li>✓ Adjunctive tests</li> </ul> <p>10.3 Visual pathway and systems</p> <ul style="list-style-type: none"> <li>✓ Vascular supply to anterior and posterior visual systems</li> <li>✓ Visual pathway defects</li> <li>✓ Disorders of visual integration</li> <li>✓ Disorders of higher cortical functions</li> <li>✓ Disorders with ocular motility anomalies/diplopia</li> </ul> <p>10.4 Nystagmus</p> <p>Etiology, classifications, clinical evaluations and management</p> <p>10.5 Miscellaneous disorders</p> <ul style="list-style-type: none"> <li>✓ Systemic disorders with neuro ophthalmologic signs</li> </ul>	05

	<ul style="list-style-type: none"> <li>✓ Optic neuropathy</li> <li>✓ Papilledema</li> <li>✓ Papillitis</li> </ul>	
<p>11.</p>	<p>GLAUCOMA</p> <p>11.1 Optic nerve, Anterior chamber and Aqueous dynamics Review</p> <p>11.2 Overview of glaucoma Diagnostic instruments</p> <p>11.3 Evaluation of optic nerve head</p> <p>11.4 Classification of glaucoma</p> <p>11.5 Primary open angle glaucoma</p> <p>Etiology, clinical features, diagnosis and management</p> <p>11.6 Primary angle closure glaucoma</p> <p>Etiology, clinical classification, clinical features, diagnosis and management</p> <p>11.7 Developmental glaucoma</p> <p>Congenital glaucoma, Infantile glaucoma and juvenile glaucoma</p> <p>Syndromes with glaucoma</p> <p>11.8 Secondary glaucoma</p> <p>Pseudoexfoliation glaucoma, pigmentary glaucoma, Inflammation induced,</p> <p>Neovascular glaucoma, Lens induced glaucoma, Traumatic glaucoma</p> <p>11.9 Glaucoma management</p> <p>Pharmacological and surgical management</p> <p>11.10 Glaucoma screening</p>	


## SYSTEMIC DISEASE

SLNO	TOPIC	HOURS
1.	<p>ARTERIAL HYPERTENSION</p> <p>1.1.Pathophysiology, classification, clinical examination, Diagnosis</p> <p>1.2.Complications, management</p> <p>1.3.Hypertension and the eye</p>	
2.	<p>DIABETES MELLITUS</p> <p>2.1.Pathology, classifications, clinical features</p> <p>2.2.Diagnosis, complications, management</p> <p>2.3. Diabetes mellitus and the eye</p>	
3.	<p>ACQUIRED HEART DISEASES- EMBOLISM</p> <p>3.1.Rheumatic fever- Pathophysiology, classifications, diagnosis</p> <p>complications and management</p> <p>3.2.embolism</p> <p>3.3.Subacute bacterial endocarditis</p>	
4.	<p>CANCER –INTRODUCTION</p> <p>4.1.Definition, nomenclature, characteristics of benign and malignant</p> <p>4.2.Grading of staging of cancer , diagnosis, principles of treatment</p>	



	4.3.Neoplasia and the eye	
5.	CONNECTIVE TISSUE DISEASES 5.1.Anatomy and pathophysiology: arthritis 5.2.Eye and connective tissue diseases	30
6.	THYROID DISEASE 6.1.Anatomy and physiology of thyroid gland 6.2.Classification of thyroid disease 6.3.Diagnosis, complications, clinical features, management 6.4.Thyroid disease and the eye	
7.	TUBERCULOSIS 7.1.Etiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complication, treatment 7.2.Tuberculosis and the eye	
8.	8.1Herpes virus ( Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus) 8.2Herpes and the eye	
9.	8.1Herpes virus ( Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus) 8.2Herpes and the eye	
10.	Myasthenia Gravis	
11.	COMMON TROPICAL MEDICAL AILMENTS 9.1.Introduction to tropical diseases: malaria	

	9.2.Tropical diseases and the eye- leprosy, toxoplasmosis, syphilis, Trachoma	
12.	MALNUTRITION 10.1.Etiology & nutritional disorders of the eye	
13.		

## **RECOMMENDED BOOKS**

1. Clinical Ophthalmology Jack.J.Kanski – 4th edition
2. Textbook of Ophthalmology A.K.Khurana
3. Parson's diseases of the eye Revised by Ramanjith Sihota & Radhika Tandon
4. Glaucoma Handbook Anthony.B.Litwak

## **LOW VISION AIDS (THEORY) & GERIATRIC OPTOMETRY**

### **LOW VISION AIDS (THEORY)**

SLNO	TOPIC	HOURS
1.	Introduction 1.1. Definition & Classification 1.2. Causes of Low Vision 1.3. Optometrist's role in Low Vision management	02
2.	Examination of a Patient with Low vision 2.1.Case history	15

	<p>2.2. Visual acuity</p> <ul style="list-style-type: none"> <li>✓ Distant vision – Charts, measurement &amp; Documentation</li> <li>✓ Near vision - Charts, measurement &amp; Documentation</li> <li>✓ Refraction – Significance &amp; Technique</li> <li>✓ Diagnostic procedures in low vision examination</li> </ul> <p>Screening for vision disability</p> <ul style="list-style-type: none"> <li>• A collaborative model of service delivery</li> <li>• Teaching other staff how to screen for vision disability and refer to you</li> <li>• Six sensory impairments, realistic simulations and performance signs</li> </ul> <p>Impaired acuity</p> <p>Impaired contrast sensitivity</p> <p>Central field loss</p> <p>Peripheral field loss</p> <p>Oculomotor problems</p> <p>Perceptual impairment</p> <ul style="list-style-type: none"> <li>• Normal age related vision loss</li> <li>• Pathogenesis</li> <li>• Sighted guide instructional video</li> </ul>	
3.	<p>Optics &amp; Characteristics of Low vision aids</p> <p>3.1. Magnification</p> <p>3.2. Galilean telescope Vs Keplarian Telescopes</p> <p>3.3. Spectacle magnifiers</p> <p>3.4. Hand Magnifiers</p>	05

	3.5.Stand Magnifiers 3.6.CCTV 3.7.Bioptic telescopes 3.8.Accessory low vision aids	
4.	Selection of Low vision aids for distance, intermediate & Near	02
5.	Guidelines & training to use various aids	02
6.	Choices of tests & Aids in various pathological conditions 6.1.Conditions causes overall blurring of the visual field 6.2.Condions causes central field defects 6.3.Conditions causes peripheral field defects	05
7.	Light, glare & Contrast in Low vision care & Rehabilitation	01
8.	Children with low vision	01
9.	Genetics	01
10.	Rehabilitation of visually handicapped	01
11.	Definitions and eligibility for services in India	02
12.	Description of advanced low vision devices and their practice	03
13.		

### **LOW VISION AIDS – PRACTICAL**

Demonstration followed by evaluation of a low vision patient by students

- Low vision case history
- Visual acuity measurement & Documentation
- Refraction
- Needed diagnostic tests for each pathological condition
- Selection, trial & dispensing of visual aids
- Rehabilitation methods

### **RECOMMENDED BOOKS**

1. Low vision care E.B.Mehr, Allen.N.Fried
2. Clinical Low vision Eleanor.E.Fay

## GERIATRIC OPTOMETRY

SLNO	TOPIC	HOUR
1.	1.1.Introduction  1.2.structural & physiological changes in the eye associated with ageing  ✓ Structural changes to lid & adnexa  ✓ Physiological changes to cornea, lens & Uvea  ✓ Degenerative & Physiological changes in vitreous, choroid & retina	02
2.	2.1.Optical & refractive changes  ✓ Refractive changes in cornea, lens & vitreous  ✓ Refractive changes due to diabetes	06

	<ul style="list-style-type: none"> <li>✓ Refractive changes due to uveitis</li> <li>✓ Cataract</li> <li>✓ Glaucoma</li> <li>✓ Macular disorders</li> <li>✓ Vascular disorders</li> </ul>	
3.	Optical correction of refractive conditions	02
4.	Dispensing in geriatric age groups <ul style="list-style-type: none"> <li>✓ Spectacle</li> <li>✓ Contact lenses</li> </ul>	03

## **RECOMMENDED BOOKS**

1. vision of the ageing patient Hirsch Wick
2. Vision & Ageing – General & Clinical perspective Alfred Rosenboom, Meredith.W.Morgan
3. Clinical refraction Borish

## **Community optometry, Eye Banking & OT Management**

### **Community optometry**

<b>SLNO</b>	<b>TOPIC</b>	<b>HOUR</b>
1.	Concepts of community optometry	3
2.	Epidemiology of blindness (general principle)	3
3.	Epidemiology of blindness (Disease specific strategies)	2
4.	Survey Methodology	2
5.	Screening procedures in optometry	2
6.	School eye screening programme	2
7.	Primary eye care	3
8.	Organization of out-reach services	2
9.	Organization of reach in programmes	2
10.	Rehabilitation of the visually impaired	2
11.	National programme for the control of blindness (NPCB)	4

## **Eye Banking**

<b>SLNO</b>	<b>TOPIC</b>	<b>HOUR</b>
1.	Eye bank structure & function	2
2.	Organization of an eye bank	3
3.	Equipment for an eye bank	2
4.	Regulatory laws for eye banking strategies to enhance eye collection	2
5.	Tissues retrieval	2
6.	Donor cornea evaluation	2
7.	Cornea preservation	4

## **OT Management**

1.	Organization of the operating room	2
2.	Sterilization	2
3.	Asepsis and principle of sterile technique	2
4.	The surgical, scrub, gown and gloves	2
5.	Preparation of the patient skin: draping	2
6.	Operation trolley setup	2
7.	Anesthesia	2
8.	O.T Instruments	3

## **ADVANCED ORTHOPTICS & PEDIATRIC OPTOMETRY**

### **ADVANCED ORTHOPTICS**

<b>SLNO</b>	<b>TOPIC</b>	<b>HOURS</b>
1.	History – recording and significance.	02



2.	<p>Convergent strabismus</p> <ul style="list-style-type: none"> <li>➤ Accommodative convergent squint</li> <li>➤ Classification</li> <li>➤ Investigation and Management</li> <li>➤ Non accommodative Convergent squint</li> <li>➤ Classification</li> <li>➤ Investigation and Management</li> </ul>	06
3.	<p>Divergent Strabismus</p> <p>Classification</p> <p>A&amp; V phenomenon</p> <p>Investigation and Management</p>	04
4.	<p>Vertical strabismus</p> <p>Classification</p> <p>Investigation and Management</p>	02
5.	<p>Paralytic Strabismus</p> <p>Acquired and Congenital</p> <p>Clinical Characteristics</p> <p>Distinction from comitant and restrictive Squint</p>	04
6.	<p>Investigations</p> <ul style="list-style-type: none"> <li>➤ History and symptoms</li> <li>➤ Head Posture</li> <li>➤ Diplopia Charting</li> <li>➤ Hess chart</li> <li>➤ PBCT</li> </ul>	12

	<ul style="list-style-type: none"> <li>➤ SPECIAL TEST</li> <li>➤ Binocular field of vision</li> </ul>	
7.	Non surgical Management of Squint	02
8.	<p>Restrictive Strabismus Features</p> <ul style="list-style-type: none"> <li>➤ Musculo fascical anomalies</li> <li>➤ Duane’s Retraction syndrome</li> <li>➤ Clinical features and management</li> <li>➤ Brown’s Superior oblique sheath syndrome</li> <li>➤ Strabismus fixus</li> <li>➤ Congenital muscle fibrosis</li> </ul>	06
9.	<p>Special forms of strabismus – clinical features and management</p> <p>Third Cranial Nerve Paralysis</p> <p>Sixth Cranial Nerve Paralysis</p> <p>Fourth Cranial Nerve Paralysis</p> <p>Thyroid Eye Disease</p> <p>Chronic Progressive External Ophthalmoegeia</p> <p>Myasthenia Gravis</p> <p>Congenital Fibrosis Syndrome</p> <p>Mobious Syndrome</p> <p>Esotropia Associated with high myopia</p> <p>Internuclear Ophthalmoplegia</p> <p>Ocular Motor Apraxia</p> <p>Superior Oblique Myokemia</p>	16

10.	Nystagmus – classification, examination and management	06
11.	Lay out orthoptics clinic	04

## **RECOMMENDED BOOKS**

1. Binocular vision & Ocular motility Von Noorden – 6th edition
2. Clinical management of binocular vision M.Scheimann, Bruce Wick – 2nd edition
3. Binocular anomalies John.R.Griffin, J.David Grisham – 4th edition
4. Practical binocular vision assessment Frank Eperjesi, Michelle.M.Rundstorm
5. Binocular vision & Orthoptics Bruce Evans, Sandip Doshi

## **PEDIATRIC OPTOMETRY**

<b>SL NO</b>	<b>TOPIC</b>	<b>HOURS</b>
1.	Introduction  1.1.Review of ocular anatomy & Physiology  1.2.Visual development-- visual system, visual acuity, refractive error, contrast  sensitivity function, eye movements, accommodation, binocular vision, color  vision	03
2.	Pediatric case history  2.1.Genetic factors  2.2.Prenatal factors	04

	2.3.Perinatal factors 2.4.Postnatal factors	
3.	Normal Appearance, pathology and structural anomalies of <ul style="list-style-type: none"> <li>✓ Orbit</li> <li>✓ Eyelids</li> <li>✓ Lacrimal system</li> <li>✓ Conjunctiva</li> <li>✓ Cornea</li> <li>✓ Sclera</li> <li>✓ Anterior chamber, Uveal tract, pupils</li> <li>✓ Lens</li> <li>✓ Vitreous, Fundus</li> <li>✓ Oculomotor system</li> </ul>	06
4.	Ocular Examination 4.1.Measurement of visual acuity <ul style="list-style-type: none"> <li>✓ Various visual acuity charts for different age groups</li> <li>✓ Teller acuity chart &amp; VEP</li> </ul> 4.2.Measurement of refractive status <ul style="list-style-type: none"> <li>✓ Dry &amp; Cycloplegic refraction</li> <li>✓ Interpretation of results</li> </ul> 4.3. 4.3.Assessment of oculomotor function 4.4.Measurement of fusion and stereopsis, color vision 4.5. Assessment of accommodation & Convergence	06
5.	Post examination processes	04

	<p>5.1.Compensatory treatment &amp; remedial therapy for</p> <ul style="list-style-type: none"> <li>✓ Myopia</li> <li>✓ Pseudomyopia</li> <li>✓ Hyperopia</li> <li>✓ Astigmatism</li> <li>✓ Anisometropia</li> <li>✓ Strabismus</li> <li>✓ Nystagmus</li> </ul>	
6.	<p>Post examination processes</p> <p>5.1.Compensatory treatment &amp; remedial therapy for</p> <ul style="list-style-type: none"> <li>✓ Myopia</li> <li>✓ Pseudomyopia</li> <li>✓ Hyperopia</li> <li>✓ Astigmatism</li> <li>✓ Anisometropia</li> <li>✓ Strabismus</li> <li>✓ Nystagmus</li> </ul>	04

## **RECOMMENDED BOOK**

1. Principles & Practice of pediatric optometry Alfred Rosenboom, M.W.Morgan
2. Pediatric Optometry Jerome Rosner
3. Clinical pediatric optometry Leonard.J.Press – 1st edition
4. Visual Development, Diagnosis, Treatment of the Robert H Duckman  
Pediatric Patients

## **ADVANCED ORTHOPTICS & PEDIATRIC OPTOMETRY PRATICAL**

Strabismus assessment

- ✓ Cover test, Krimsky, Synaptophore, Sterioacuity test, Diplopia charting
- Examination procedures of different types of strabismus and its nonsurgical Management

## **RESEARCH METHODOLOGY & STATISTICS**

<b>SLNO</b>	<b>TOPIC</b>	<b>HOUR</b>
1.	Introduction I: Biostatistics <ul style="list-style-type: none"><li>✓ Definition</li><li>✓ role of statistics in health science and health care delivery system</li></ul>	
2.	Introduction II: Research Methodology <ul style="list-style-type: none"><li>✓ Research process</li><li>✓ Steps involved in research process</li><li>✓ Research methods and methodology</li></ul>	
3.	Variables and scales of measurements <ul style="list-style-type: none"><li>✓ Definitions and examples of qualitative, quantitative, continuous</li></ul>	

	<p>discrete, dependent and independent variables.</p> <p>✓ Definitions, properties and examples of nominal, ordinal, interval and ratio scales of measurements.</p>	
4.	<p>Sampling</p> <p>✓ Population, sample, sampling, reasons for sampling, probability and non-probability sampling.</p> <p>✓ Methods of probability sampling – simple random, stratified, systematic- procedure</p> <p>✓ Merits and demerits.</p> <p>✓ Use of random number table.</p>	
5.	<p>Organization of data</p> <p>✓ Frequency table, histogram, frequency polygon, frequency curve, bar diagram, pie chart</p>	
6.	<p>Measures of location</p> <p>✓ Arithmetic mean, median, mode, quartiles and percentiles – definition</p> <p>✓ Computation (for raw data), merits, demerits and applications</p>	
7.	<p>Measures of variation</p> <p>✓ Range, inter-quartile range, variance, standard deviation, coefficient of variation- definition</p> <p>✓ Computation (for raw data), merits, demerits and applications</p>	<u>60</u>

8.	<p>Normal distribution</p> <ul style="list-style-type: none"> <li>✓ Concept, graphical form, properties, examples</li> <li>✓ Concept of Skewnes and Kurtosis</li> </ul>	
9.	<p>Correlation</p> <ul style="list-style-type: none"> <li>✓ Scatter diagram</li> <li>✓ concept and properties of correlation coefficient, examples [No computation]</li> </ul>	
10.	<p>Health Information System</p> <ul style="list-style-type: none"> <li>✓ Definition, requirement, component and uses of health information system.</li> <li>✓ Sources of health information system- Census, Registration of vital events, Sample registration system (SRS), Notification of diseases, Hospital records, Disease registries, Record linkage, Epidemiological surveillance, Population survey</li> </ul>	
11.	<p>Vital statistics and hospital statistics</p> <ul style="list-style-type: none"> <li>✓ Rate, ratio, proportion, Incidence, Prevalence. Common morbidity, mortality and Fertility statistics – Definition and computation.</li> </ul>	
12.	<p>Hypothesis</p> <ul style="list-style-type: none"> <li>✓ What is hypothesis</li> <li>✓ Formulation of hypothesis</li> </ul>	



	✓ Characteristics of good hypothesis.	
13.	Epidemiology ✓ Concept of health and disease ✓ Definition and aims of Epidemiology, ✓ Descriptive Epidemiology- methods and uses.	
14.	Concept of reliability & validity	

## **RECOMMENDED BOOKS**

1. Methods in Biostatistics for medical students & Research workers Mahajan B.K.- 6th edition
2. Research methodology – Methods & techniques Kothari.C.R
3. Introduction to Biostatistics: A manual for students in health sciences Sundar Rao PSS, Richard.J
4. Text book of Preventive and social medicine Park.E.Park

## **CLINICS AND SPECIAL CLINICS**

**No. of practical hrs. : 270**

1. Case sheet
2. History taking
3. Lensometry
4. Visual acuity
5. Tests for phorias and tropias
6. External examination
7. Slit lamp examination
8. Drugs and method of application
9. Do's and don'ts – Pupillary dilatation
10. Direct ophthalmoscopy
11. Indirect ophthalmoscopy

12. Instrumentation
13. Patients selection
14. Keratometry reading
15. Refraction
16. Fluorescein pattern
17. Over refraction
18. Fitting of hard lenses
19. Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition

The students are made to observe the interneers initially, then gradually they are encouraged to work up a patient and perform various examination techniques.

## **FOURTH YEAR**

- **PROJECT WORK**
- **CLINICAL INTERNSHIP**

