



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்  
**MANONMANIAM SUNDARANAR UNIVERSITY**

**SYLLABUS FOR ADVANCED DIPLOMA IN OPTOMETRY PROGRAMME  
OFFERED THROUGH DIRECTORATE OF VOCATIONAL EDUCATION  
(COMMUNITY COLLEGES AND VOCATIONAL SKILL DEVELOPMENTCENTRES)  
FROM 2024 - 2025**



## ADVANCED DIPLOMA IN OPTOMETRY -5135

மேம்பட்ட பார்வை அளவையியல் பட்டயம்

## SCHEME OF EXAMINATION

Course code	Title of the Course	Credit	Hours	Passing Minimum
<b>Semester I</b>				
C24OP11 / E24OP01	Ocular Anatomy	6	90	40/100
C24OP12 / E24OP02	Ocular Physiology	6	90	40/100
C24OP13 / E24OP03	Geometrical Optics	6	90	40/100
C19CE10 / E19CE10	Communicative English	6	90	40/100
C24OPP1 /E24OPP1	Practical I - Geometrical optics	4	120	40/100
<b>Semester II</b>				
C24OP21 / E24OP04	Microbiology & Pathology	6	90	40/100
C24OP22 / E24OP05	Physical Optics	6	90	40/100
C24OP23 / E24OP06	Optometric Instruments	6	90	40/100
C19LS23 / E19LS05	Life Skill	10	90	40/100
C24OPP2 / E24OPP2	Practical II - Optometric Instruments	4	120	40/100
<b>Semester III</b>				
C24OP31 / E24OP07	Community Ophthalmology	6	90	40/100
C24OP32 / E24OP08	Visual Optics	6	90	40/100
C24OP33 / E24OP09	Ocular Diseases - I	6	90	40/100
C24OP34 / E24OP10	General and Ocular pharmacology	6	90	40/100
C24OPP3 / E24OPP3	Practical III - Ocular Diseases	4	120	40/100
<b>Semester IV</b>				
C24OP41 / E24OP11	Optometric Optics	6	90	40/100
C24OP42 / E24OP12	Ocular Diseases - II	6	90	40/100
C24OP43 / E24OP13	Contact Lens, Optical Dispensing & Low Vision Aids	6	90	40/100
C24OP44 / E24OP14	Binocular vision	6	90	40/100
C24OPPW / E24OPPW	Project Work - Internship	10	120	40/100

**Eligibility for admission:** Pass in 10<sup>th</sup> std examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

**Examination:** Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

40 % but less than 50 %	- Third class
50 % but less than 60 %	- Second class
60 % and above	- First class

**Theory Paper**

Internal Marks-25

External Marks-75

**SYLLABUS**

**Semester - I**

Course I	:	Ocular Anatomy
Course II	:	Ocular Physiology
Course III	:	Geometrical Optics
Course IV	:	Communicative English
Course V	:	Practical I - Geometrical Optics

**Semester - II**

Course VI	:	Microbiology & Pathology
Course VII	:	Physical Optics
Course VIII	:	Optometric Instruments
Course IX	:	Life Skill
Course X	:	Practical II - Optometric Instruments

**Semester - III**

Course XI	:	Community Ophthalmology
Course XII	:	Visual Optics
Course XIII	:	Ocular Diseases - I
Course XIV	:	General and Ocular Pharmacology
Course XV	:	Practical III – Ocular Diseases

**Semester IV**

Course XVI	:	Optometric Optics
Course XVII	:	Ocular Diseases - II
Course XVIII	:	Contact Lens & Low Vision Aids
Course XIX	:	Binocular Vision
Course XX	:	Project Work - Internship

**\*(Semester Pattern for Community College Only)**

**SEMESTER I**  
**COURSE I**  
**(C24OP11 / E24OP01) OCULAR ANATOMY**

**Unit I** **18 Hrs**

**Structure & Developments of the eye:**

Introduction - Embryology – Formation of Eye - Development of various structure of eye ball - Milestones of development of ocular structures. - Orbit and Orbital Nerves -. Orbital nerve – Oculomotor nerves.

**Unit II** **18 Hrs**

**Gross Anatomy of Eyelid:**

Glands of the Lids - Blood Supply - Nerve Supply. Conjunctiva: Gross anatomy - Microscopic structures - Glands - Accessory structures - Blood Supply - Nerve Supply. Lacrimal apparatus: Lacrimal glands - Lacrimal passages. Retina - Rods and Cones – Blood supply.

**Unit III** **18 Hrs**

**Microscopic structure of Eye:**

Cornea: Blood supply - Nerve supply. Sclera: Thickness – Special regions – Scleral apertures-Blood supply - Nerve supply. Anterior chamber: Angle of the anterior chamber.

**Unit IV** **18 Hrs**

**Appearance of Uvea & Lens:**

Uvea: Iris - macroscopic & microscopic appearance - Ciliary body - microscopic structure & ciliary processes. Choroid - macroscopic structure - Blood supply. Lens: Introduction –Structure of the lens - Structure of ciliary zonules.

**Unit V** **18Hrs**

**Visual Pathway:**

Optic nerve - Optic chiasma - Optic tracts - Lateral geniculate body - Optic radiations – Visual cortex - Arrangement of nerve fibres - Blood supply.The Ocular motor system: Extraocular muscles – Origin, Course, Insertion, Blood supply and Nerve supply.

**Text Books:**

1. AK Khurana, Indu Khurana: *Anatomy and Physiology of Eye*, Second edition, CBS Publishers, New Delhi, 2006.
2. 4. *Clinical Anatomy of the Eye* 2nd Edition, Kindle Edition by Richard S. Snell (Author), Michael A. Lemp

**Reference books:**

- ❖ Remington: *Clinical Anatomy of the Visual System*, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.
- ❖ *Functional Anatomy and Histology of Eye* – Gordon Ruskell, Butterworth Heinemann
- ❖ *Atlas of Ocular Anatomy Hardcover* –2016 by Mohammad Wakeel Ansari, Ahmed Nadeem

**SEMESTER I**  
**COURSE II**  
**(C24OP12 / E24OP02) OCULAR PHYSIOLOGY**

**Unit I** **18 Hrs**

**Functions of Cornea & Aqueous Humour:**

Cornea: Functions - Corneal transparency - Factors affecting corneal transparency. Uveal tissue: Functions. Aqueous Humour: Functions and Properties - Formation of Aqueous humour - Drainage & circulation of Aqueous Humour - Rates of production & flow. Intraocular pressure: Features of normal IOP - Factors influencing the IOP - Measurement of IOP.

**Unit II** **18 Hrs**

**Functions of Lens & Retina:**

Lens: Function of lens - Lens transparency - Changes in ageing lens - Cataract. Accommodation: Far point, near point - Mechanism of accommodation – Relaxation theory, Increased tension theory, - Changes in accommodation. Vitreous Humour: Functions –Physicochemical properties. Retina: Organization of retina - Functions of retina – Initiation and transmission of visual sensations, Visual perception. Optic Nerve: Lesions of the visual pathway - Physiology of optic nerve

**Unit III** **18 Hrs**

**Physiology of eyelid movements:**

Opening & Closing movements - Muscles of lid closer & opening - Peering – Blinking. Lacrimation: Lacrimal glands – Functions of Tear film - Tear film dynamics. Pupil: Normal pupil - Physiological changes in pupil size - Isocoria - Pupillary unrest - Hippies - Pupillary reflex – Light reflex, Near reflex, Darkness reflex, Psycho sensory reflex, Lid closure reflex – Abnormalities of pupil and pupillary reflexes.

**Unit IV** **18 Hrs**

**The ocular motor system:**

Extra ocular muscles - Functions - Basic Kinematics - Mechanics of actions – Agonist, Antagonist, Synergist and Yoke muscles - Fundamental laws (Donder's, Listing's, Herring's and Sherrington's law) - Ocular Movements (Monocular and Binocular) - Supranuclear eye movement systems.

**Unit V** **18 Hrs**

**Ocular Circulation:**

Vascular structure of the eye – ocular circulation, blood - ocular barrier. Regulation of ocular circulation. Visual Adaptation: Dark adaptation curve - Mechanism of dark adaptation - Factors influencing dark adaptation - Time course of light adaptation - Mechanism of light adaptation - Rod vs. cone light adaptation.

**Text Books:**

1. Comprehensive Ophthalmology by A K Khurana – 9<sup>th</sup> Edition.
2. Essentials of Ophthalmology by Samar k Basak – 8<sup>th</sup> Edition.

**Reference Books:**

- ❖ A Remington: *Clinical Anatomy of the Visual System*, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.
- ❖ *Clinical Ocular Physiology* – Nagi Hang Victor Chong, Butterworth Heinemann

**SEMESTER I**  
**COURSE III**  
**(C24OP13 / E24OP03) GEOMETRIC OPTICS**

**Unit I** **18 Hrs**

**Nature of Light:**

Light as an electromagnetic wave – ideas of sinusoidal oscillation – Fermat's principle – geometrical and optical path lengths – laws of reflection and refraction using Fermat's principle – reflection by plane and spherical mirrors – reflectivity and transmittance – concepts of wave fronts and rays – Vergence – divergence and convergence.

**Unit II** **18 Hrs**

**Refractive Index:**

Absolute and relative refractive indices – Snell's law – Refraction by plane glass slab – Refraction by spherical surfaces – convex and concave – Derivation of Vergence equation – Focal points – lateral and axial magnification – Thin lenses - imaging by thin convex and concave lenses – image properties

**Unit – III** **18 Hrs**

**Front and Back vertex powers:**

Equivalent power – equivalent focal length of two thin lenses placed in contact and separated by a distance – Thick lenses – Cardinal points/planes – matrix methods in paraxial optics – refraction and translation matrices.

**Unit – IV** **18 Hrs**

**Aberrations:**

Chromatic aberrations – methods of removing chromatic aberration – monochromatic aberrations - spherical aberrations, coma, astigmatism, distortion and curvature of field – ways of minimizing them.

**Unit – V** **18 Hrs**

**Solid Prisms:**

Deviation produced by a prism – angular dispersion – dispersive power – reflecting prisms – total internal reflection and critical angle – optical fibres – types and theory of OFCS – uses.

**Text Books:**

- 1.A Text book of Optics, S Chand Co by Dr.N. Subrahmanyam, Brijlal,& M.N.Avadhanulu.
- 2.Optics – Principles and Applications by K K Sharma.

**Reference Books:**

- ❖ Pedrotti L.S, Pedrotti Sr.F.L, *Optics and Vision*, Prentice hall
- ❖ Keating.N.M, *Geometric, Physical and Visual Optics*
- ❖ Milton Kartz, *Introduction to Geometric Optics*, World Scientific Publishing Co.

## SEMESTER I

### COURSE IV

#### (E19CE10/C19CE10)COMMUNICATIVE ENGLISH

##### 1. **Basic Grammar:**

- a. Review of grammar
- b. Remedial study of grammar
- c. Simple sentence
- d. Word passive voice etc.

##### 2. **Bubbling Vocabulary:**

- a. Synonyms
- b. Antonyms
- c. One – work Institution

##### 3. **Reading and Understanding English**

- a. Comprehension passage
- b. Précis – writing
- c. Developing a story from hints.

##### 4. **Writing English**

- a. Writing Business letters.
- b. Paragraph writing
- c. Essay writing
- d. Dialogue writing

##### 5. **Speaking English**

- a. Expressions used under different circumstances
- b. Phonetics

##### **Reference**

- ❖ V.H.Baskaran – “English Made Easy”
- ❖ V.H.Baskaran – “English Composition Made Easy” (Shakespeare Institute of English Studies, Chennai)
- ❖ N.Krishnaswamy – “Teaching English Grammar”(T.R.Publication, Chennai)
- ❖ “Life Skill” – P.Ravi, S.Prabakar and T.Tamzil Chelvam,M.S.University, Tirunelveli.

## SEMESTER I

### COURSE V

#### (C24OPP1 / E24OPP1) PRACTICAL I – GEOMETRIC OPTICS

##### Experiments

1. Image formation by spherical mirrors.
2. u.v method – focal length of the lens.
3. Spherical lenses – power determination liquid lens.
4. Refraction through a glass slab.
5. Spherometer – radius of curvature.
6. Refractive index of a transparent liquid by travelling microscope.
7. Spectrometer – Refractive index of a solid prism.
8. Spectrometer – solid prism (i – d curve).
9. Spectrometer – dispersive power of a prism.
10. Spectrometer – grating constant.
11. Nodal slide – cardinal points.

##### Reference Books:

- ❖ .A practical guide to experimental geometrical optics – Yuriy A Garbovskiy, Anatoliy V. Glushchenko.
- ❖ Manual of Optics and Refraction by PK Mukherjee – 2<sup>nd</sup> Edition.
- ❖ Simple experiments in optics – Roshan Aggarwal and Kambiz Alavi
- ❖ Optics experiments and demonstration for student laboratories – Stephan G Lipson



**SEMESTER II**  
**COURSE VI**  
**(C24OP21 / E24OP04) MICROBIOLOGY & PATHOLOGY**

**Unit I**

**18 Hrs**

**Introduction to microbiology:**

Definition of microbiology and Ocular microbiology, Normal ocular flora. Morphology of bacteria and virus. Sterilization and disinfection – Physical and chemical methods. General immune system, structure and function of immunoglobulin. Basic laboratory Techniques- Collection of specimens; Conjunctiva swab, Lacrimal sac.

**Unit II**

**18 Hrs**

**Ocular Bacteriology:**

Clinical importance, ocular lesions of: Gram positive cocci -Staphylococci, Streptococci, Pneumococci; Gram negative cocci –Gonococci and Meningococci; Gram positive bacilli – Corynebacterium diphtheriae; Gram Negative bacilli –Pseudomonas, Haemophilus; Mycobacteria – M. Tuberculosis; Spirochetes – Treponema pallidum,

**Unit III**

**18 Hrs**

**Ocular Virology:**

Clinical importance, ocular lesions and treatment of Common virus – Poxvirus, Adenovirus, Picornavirus, Rubella and Retro virus. Ocular Parasitology: Clinical importance, Ocular lesions and treatment of Acanthameoba, Toxocara, Filaria, Toxoplasma.

**Unit IV**

**18 Hrs**

**General Pathology:**

Tissue injury, vascular and cellular components involved in inflammation. Healing and Repair – Role of Vascular and Cellular component

**Unit V**

**18 Hrs**

**Ocular pathology:**

Eye lids – Chalazion, Hordeolum internum and externum; Conjunctiva - conjunctivitis; Cornea - Ulcers; Lens - Pathology of cataract, types, Lens induced glaucoma & uveitis and Diabetic cataract. Tumours – Retinoblastoma, Malignant Melanoma, Squamous cell carcinoma, Lacrimal gland tumors.

**Text Books:**

1. Textbook of Microbiology by Ananthanarayan and Paniker – 7<sup>th</sup> Edition.
2. Textbook of Pathology by Harsh Mohan – 8<sup>th</sup> Edition.

**Reference Books:**

- ❖ Microbiology: An Introduction by Tortora GJ, Funke BR, and Case CL
- ❖ Clinical Ocular Pathology – John Harry- Gery Misson, Butterworth Heinemann

**SEMESTER II**  
**COURSE VII**  
**(C24OP22 / E24OP05) PHYSICAL OPTICS**

**Unit I**

**18 Hrs**

**Huygens' Principle:**

Laws of reflection and refraction at a plane surface. Wave equation, Wave velocity & group velocity; determination of velocity of light (any one method). Simple harmonic waves - mathematical representation.

**Unit II**

**18 Hrs**

**Interference:**

Path and phase difference. Theory of interference fringes - intensity distribution in fringes. Young's double slit experiment- fringe width. Fresnel's biprism, Lloyd mirror - visibility of fringes in them. Interference in thin films - Newton's ring experiment -Thin film anti-reflection coatings.

**Unit -III**

**18 Hrs**

**Diffraction:**

Fresnel and Fraunhofer diffraction. Diffraction by single slit, double slit, multiple slit. Diffraction grating- transmission and reflection. Diffraction by circular aperture - airy pattern. Dispersion by grating - dispersive power, resolution.

**Unit IV**

**Polarization:**

**18 Hrs**

Linearly polarized light - Production of linearly polarized light. Anisotropic crystals – calcite crystal. Linear polarizers – Nicol prism, Polaroid sheets. Malus' law – nicol prism as polarizer and analyser. Circularly and elliptically polarized light - analysis of light of unknown polarization – Optical activity – Scattering of light – Raman effect.

**Unit V**

**18 Hrs**

Laser fundamentals - spontaneous and stimulated emissions – Einstein's theory – Population inversion, lasing action – ruby laser. Laser in ophthalmic surgery. Holography – basic principle, some applications. Spectrum - emission and absorption spectra - classification (visible, ultraviolet, infrared). Measurement of light – radiometry and photometry – photometric units .

**Text Books:**

1. A Text book of Optics, S Chand Co by Dr.N. Subrahmanyam, Brijlal,& M.N.Avadhanulu.
2. Optics – Principles and Applications by K K Sharma.

**Reference Books:**

- ❖ Pedrotti L S, Pedrotti Sr. F L - *Optics and vision* - Prentice hall, New Jersey, USA.
- ❖ Keating - *Geometrical, physical and visual optics* - Butter Worth – Heinemann, Massachusetts, USA.
- ❖ Tunnacliffe A H, Hirst J G – *Optics* - the association of British opticians - London, USA.

**SEMESTER II**  
**COURSE VIII**  
**(C24OP23 / E24OP06) OPTOMETRIC INSTRUMENTS**

**Unit I**

**Trial Set:**

**18 Hrs**

Trial Frame & its components, Trial lens & Accessories - Pinhole, Occluder, Stenopaic slit, Maddox rod, Red-Green filters. Vision Charts: Distance & Near, Snellen & Log MAR, Pediatric vision charts, Vision drum, Projection charts. Lensometer: Manual & Automated lensometer.

**Unit II**

**18 Hrs**

**Retinoscope:**

Spot retinoscope, Streak retinoscope -Autorefractometer.

RAF ruler - Prism bar - Cover Test - Maddox rod - Maddox wing - Synoptophore.

**Unit III**

**18 Hrs**

**Tonometer:** Principles, types, clinical significance.

**Keratometer** - Corneal topography - Slit lamp.

**Unit IV**

**18 Hrs**

**Dry eye evaluation:**

Schimmer's, TBUT, NITBUT, Lacrimal syringing, ROPLAS. Colour Vision testing devices.

Visual Field: Amslers chart, Bjerrum screen, Automated Perimetry.

**Unit V**

**18 Hrs**

Ophthalmoscope - Gonioscope - A Scan - B Scan - Pachymeter.

**Text Books:**

1. Optometric Instrumentation and Techniques by Sandeep Nair.

2. Ocular Instruments: A Guide by Ramesh C. Gupta.

**Reference Books:**

❖ David B Henson: Optometric Instrumentation, Butterworth-Heinemann Ltd (1 December 1982)

❖ Optometric Instrumentation - Santosh K. Kumar

❖ Primary Care Optometry - Theoder Grosvenor

**SEMESTER II**  
**COURSE IX**  
**(C19LS23/E19LS05) LIFE SKILL**

**I Life Coping or adjustment**

- (a) External and internal influence in one's life
- (b) Process of coping or adjustment
- (c) Coping with physical change and sexuality
- (d) Coping with stress, shyness, fear, anger far live and criticism.

**II Attitude**

- (a) Attitude
- (b) Self acceptance, self - esteem and self actualization
- (c) Positive thinking

**III Problem Solving**

- (a) Goal Setting
- (b) Decision Making
- (c) Time Management and stress Management.

**IV Computers**

- (a) Introduction to Computers
- (b) M.S. Office
- (c) Power Point

**V Internet**

- (a) Introduction to internet
- (b) E - mail
- (c) Browsing

**References:**

- 1) Life Skill Programme course I&II by Dr.XavierAlphonaMCRDCE Publications. R.K.Mutt Road, Chennai – 28
- 2) ஆளுமைண்பு வளர்த்தல் மற்றும் தகவல் தொடர்பு by M.SelvarajCommunity College,Palayamkottai
- 3) “LifeSkill”–P.Ravi,S.Prabahar&T.TamilChelvam,M.S.University, Tirunelveli

**SEMESTER II**  
**COURSE X**  
**(C24OPP2 / E24OPP2) PRACTICAL II – OPTOMETRIC INSTRUMENTS**

**Experiments:**

1. Refractive instruments: Test chart standards
2. Trial case lenses
3. Lensometer.
4. Auto refractors
5. Retinoscope.
6. Tonometer
7. Keratometer
8. Schirmer's test.
9. Colour vision testing devices
10. Orthoptic Instruments.
11. Fields of vision and screening devices.

**Reference Books:**

- ❖ Manual of Optometry Instruments and Procedures by Vivekanand – AITBS Publishers,  
India.
- ❖ 2. Manual for Ophthalmic Instruments & Clinical Procedures by Manjusha Lakshmi. M  
2<sup>nd</sup> Edition.

## **SEMESTER III**

### **COURSE XI**

#### **(C24OP31 / E24OP07) COMMUNITY OPHTHALMOLOGY**

##### **Unit I**

**18 Hrs**

Clinical ophthalmology including refraction recent advances including investigative therapeutic procedure, community ophthalmology including.

##### **Unit II**

**18 Hrs**

Clinical ophthalmology including refraction recent advances including investigative therapeutic procedure, community ophthalmology including national programme, rehabilitation of blind.

##### **Unit III**

**18 Hrs**

Eye problems in community people, Health education in common eye disorders.

##### **Unit IV**

**18 Hrs**

Blindness – categories of visual impairment –Magnitude – Various diseases causing blindness - methods of intervention –nutritional blindness - National program for control of blindness.

##### **Unit V**

**18 Hrs**

vision 2020 – the right to sight initiative – human resource development – role of camps in blindness prevention- role of eyebanks in blindness prevention

##### **Text Books:**

- 1.Community Ophthalmology by S.Natarajan and L.Vijaya.
- 2.Textbook of Community Ophthalmology by R.Paramarajasegaram.

##### **Reference Books:**

- ❖ A K Khurana: Comprehensive Ophthalmology, 4<sup>th</sup> edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
- ❖ Stephen J. Miller : Parsons Diseases of the Eye, 18<sup>th</sup> edition, Churchill Livingstone, 1990.
- ❖ Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2nd Ed., 1989.

**SEMESTER III**  
**COURSE XII**  
**(C24OP32 / E24OP08) VISUAL OPTICS**

**Unit I**

**18 Hrs**

**Optics of ocular structure:**

cornea, aqueous, crystalline lens, Vitreous - Schematic and reduced eye - Aberration of the eye – Purkinje images - Measurement of optical constant of the eye: corneal curvature and thickness, keratometry, lens curvature, axial and axis of the eye - Basic aspects of vision: visual acuity, colour vision, contrast sensitivity, light and dark adaptation.

**Unit II**

**18 Hrs**

**Refractive conditions:**

Myopia, Hyperopia, Astigmatism, Anisometropia, Aniseikonia, Aphakia and pseudophakia - Refractive anomalies and their causes: Etiology of refractive anomalies, Contributing variability and their ranges, Populating distributions of anomalies - Optical component measurements: Growth of the eye in relation to refractive errors.

**Unit III**

**18 Hrs**

**Accommodation:**

Mechanism of accommodation, Scheiner's disc experiment, changes in the lens during accommodation, Far point and near point of accommodation, range of accommodation, amplitude of accommodation and its measurements, Relationship between accommodation and convergence, AC/A ratio - Presbyopia: etiology, types, sign, symptoms and management.

**Unit IV**

**18 Hrs**

**Refraction & Magnification:**

Ocular refraction (K), Spectacle refraction (F) and relationship between spectacle refraction (F) and ocular refraction (K) - Ocular accommodation versus spectacle accommodation - Vertex distance and the effect of vertex distance change - Depth of field and Depth of focus - Magnification: Spectacle magnification, ocular magnification and relative spectacle magnification.

**Unit V**

**18 Hrs**

**Retinoscopy:**

Principle, procedures and clinical application of Retinoscopy - Review of subjective refractive methods: Cross cylinder methods for astigmatism, Astigmatic Fan Test - Difficulties in subjective and objective tests and their avoidance - Binocular balancing and refraction – Prescribing prisms.

**Text Books:**

1. Basic and Clinical Optics by B.K.Mathur.
2. Theory and practice of Optics and Refraction by A K Khurana – 5th Edition – Elsevier.

**Reference Books:**

- ❖ A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
- ❖ AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998
- ❖ WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006
- ❖ T Grosvenor: Primary Care Optometry, 4th edition, Butterworth – heinneman, USA, 2002



## SEMESTER III

### COURSE XIII

#### (C24OP33 / E24OP09) OCULAR DISEASES – I

##### Unit I

18 Hrs

**Disease of the Lids:** Congenital Deformities of the Lids - Oedema of the Lids - Inflammatory Conditions of the Lids - Deformities of the Lid Margins - Deranged Movement of the Eyelids - Neoplasm's of the Lids - Injuries of the Lids. **Diseases of the Lachrymal Apparatus:** Dry Eye – Watering Eye - Disease of the Lachrymal Gland - Disease of the Lachrymal Passages.

##### Unit II

18 Hrs

**Disease of the Conjunctiva:** Subconjunctival Haemorrhage - Infective Conjunctivitis - Follicular Conjunctivitis - Granulomatous Conjunctivitis - Allergic Conjunctivitis - Vitamin- A Deficiency - Cysts and Tumours of the Conjunctiva - Conjunctival Pigmentation - Injuries of the Conjunctiva.

##### Unit III

18 Hrs

**Disease of the Cornea:** Congenital Anomalies - Inflammation of the Cornea (Keratitis) - Superficial Keratitis - Deep Keratitis - Vascularisation of Cornea - Opacities of the Cornea – Keratoplasty - Corneal Degenerations - Corneal Dystrophy's - Corneal Pigmentation - Corneal Injuries - Refractive Corneal Surgery - Corneal Ulcer ( Bacterial , Viral , Fungal ).

**Disease of the Sclera:** Episcleritis – Scleritis - Staphyloma of the Sclera - Blue Sclerotic Scleromalacia Performs – Nanophthalmos - Injuries of the Sclera.

##### Unit IV

18 Hrs

**Disease of the Iris:** Congenital Anomalies - Inflammations (Anterior Uveitis) - Specific Types of Iridocyclitis - Degenerations of the Iris - Cysts and Tumours of the Iris - Injuries of the Iris. **Disease of the Ciliary Body:** Inflammations of the Ciliary Body - Tumours of the Ciliary body - Injuries of the Ciliary body.

##### Unit V

18 Hrs

**Glaucoma:** Developmental Glaucoma (Buphthalmos) - Primary Narrow Angle Glaucoma - Primary Open Angle Glaucoma - Ocular Hypertension - Secondary Glaucoma - Surgical Procedures for Glaucoma (Steps Only), trabeculectomy - Laser Procedure in Glaucoma - Artificial Drainage Devices in Glaucoma Surgery (Molteno). **Disease of the Lens:** Congenital Malformations – Cataract - Congenital and Developmental Cataract - Senile Cataract - Traumatic Cataract - Complicated Cataract

##### Text Books:

1. Essentials of Ophthalmology by Samar k Basak – 8<sup>th</sup> Edition.
2. Comprehensive Ophthalmology by A K Khurana - 4th edition, New age international (p) Ltd. Publishers, New Delhi.

##### Reference Books: , 2007

- ❖ Stephen J. Miller : *Parsons Diseases of the Eye*, 18th edition, Churchill Livingstone, 1990
- ❖ Jack J. Kanski *Clinical Ophthalmology: A Systematic Approach*, 6th edition, Butterworth - Heinemann, 2007

## SEMESTER III

### COURSE XIV

#### (C24OP34 / E24OP10) GENERAL & OCULAR PHARMACOLOGY

##### Unit I

18 Hrs

Nature & Sources of drug - Routes of drug administration (general & Ocular) - New drug delivery systems - Absorption & factors effecting drug absorption - Distribution & factors effecting drug distribution - Drug metabolisms - Drug excretion & toxicity.

##### Unit II

18 Hrs

Classification of drugs - Drug action - site of drug action, structure activity relationship - Drug receptor - Mechanism of drug action - Dose response relationship - Adverse drugs reactions (ADR) in man - Treatment of Acute drug poisoning.

##### Unit III

18 Hrs

Drug action on the nervous system - General Considerations - General Anesthetics - Sedatives, Hypnotics - Drugs Effective in Convulsive Disorders - Analgesic – Antipyretics and Non-steroidal Anti-inflammatory Drugs (NSAID) - Local Anesthetics – Cocaine and Procaine.

##### Unit IV

18 Hrs

Autonomic Nervous System - Types, Classification and functions of Adrenergic and Cholinergic receptors - Adrenergic and Adrenergic Blocking Drugs - Cholinergic and anti - cholinergic drugs.

##### Unit V

18 Hrs

Preparation and packaging of ophthalmic drugs - Drug action and effectiveness - Ocular penetration - Ophthalmic diagnostic drugs - Topical anaesthetics - Ophthalmic Drugs – antibiotics, corticosteroids.

##### Text Books:

1. Textbook of Pharmacology by H.P.Rang, M.M.Dale, J.M.Ritter, and R.J.Flower.
2. Ocular Pharmacology by Chatterjee P.K.

##### Reference Books:

- ❖ K D TRIPATHI: *Essentials of Medical Pharmacology*. 5th edition, Jaypee, New Delhi, 2004
- ❖ Ashok Garg: *Manual of Ocular Therapeutics*, Jaypee, New Delhi, 1996
- ❖ T J Zimmerman, K S Kooner, M Sharir, R D Fechtner: *Text Book of Ocular Pharmacology*, Lippincott-Raven, Philadelphia, 1997.

**SEMESTER III**  
**COURSE XV**  
**(C24OPP3 / E24OPP3) PRACTICAL III - OCULAR DISEASES**

**EXPERIMENTS:**

1. History taking
2. Checking Visual acuity
3. Torch light examination of anterior segment
4. Objective refraction
5. Do objective refraction using Auto refractometer
6. Subjective refraction
7. Prescription writing
8. Frame alignment checking
9. Doing A scan for biometry
10. Cleaning procedures
11. Spectacle lens power checking
12. Duct Syringing
13. Cataract – Evaluation.

**Reference Books:**

- ❖ Parson's Diseases of the Eye by Ramanjit Sihota & Radhika Tandon – 24<sup>th</sup> Edition.
- ❖ Clinical Manual of ophthalmology by Madhurima A Nayak- Paras medical Publisher.
- ❖ Ophthalmology Oral and Practical by Samar K Basak & Soham Basak – 5<sup>th</sup> Edition.

**SEMESTER IV**  
**COURSE XVI**  
**(C24OP41 / E24OP11) OPTOMETRIC OPTICS**

**Unit I** **18 Hrs**

**Introduction to Spectacle Lenses:**

Forms of Lenses- Cylindrical and Sphero-cylindrical Lenses - Properties of Crossed Cylinders - Astigmatic Lenses- Axis Direction of Astigmatic Lenses- Obliquely Crossed Cylinders- Sag Formula- Miscellaneous Spectacle Lenses- Vertex Distance and Vertex Power- Aberrations in Ophthalmic Lenses- Fresnel Prisms- Lenses and Magnifiers.

**Unit II** **18 Hrs**

Manufacture of Glass - Lens Surfacing- Principle of Surface Generation and Glass Cements.

Faults in Lens Material - Faults on Lens Surface - Inspecting the Quality of Lenses Toughened Lenses.

**Unit III** **18 Hrs**

Definition of Prisms - Units of Prism Power - Thickness difference and Base - Apex Notation - Dividing- Compounding and Resolving Prisms- Rotary Prisms and Effective Prism Power in Near Vision-Prismatic Effect- Decentration

**Unit IV** **18 Hrs**

Frame Types and Parts Classification of Spectacle Frames – Material, Weight, Temple Position, Coloration; Frame Construction- Frame Measurements and Markings.

**Unit V** **18 Hrs**

Magnification in high plus lenses, Minification in high minus lenses - Aberration in Ophthalmic Lenses.

**Text Books:**

1. Theory and practice of Optics and Refraction by A K Khurana – 5th Edition – Elsevier.
2. Manual of Optometry by D.B.Venkateswara Rao.

**Reference Books:**

- ❖ Jalie M: *The principles of Ophthalmic Lenses*, The Association of Dispensing Opticians, London, 1994.
- ❖ David Wilson: *Practical Optical Dispensing*, OTEN- DE, NSW TAFE Commission, 1999.
- ❖ 3.C. V. Brooks, I M Borish: *System for Ophthalmic Dispensing*, Second edition, Butterworth Heinemann, USA, 1996.
- ❖ *Practice of Refraction* = Duke Elders, Edn. 9 1991.
- ❖ *Optics for Clinicians* = MELVIN L RUBIN, Triad, 2nd Edition, 1974

**SEMESTER IV**  
**COURSE XVII**  
**(C24OP42 / E24OP12) OCULAR DISEASES – II**

**Unit I**

**18 Hrs**

**Diseases of the Retina & Vitreous Humor:** Congenital and developmental disorders - Inflammatory disorders - Retinal artery and vein occlusions - Mascular disorders - Retinal degenerations -Retinal detachment - Retinoblastoma.

Congenital Anomalies, Hereditary Vitreo – Retinal Degeneration's, Vitreous Haemorrhage, Detachment of Vitreous Humor, Vitreous Surgery, Methods of clinically assessing the posterior segment (direct& indirect ophthalmoscopy).

**Unit II**

**18 Hrs**

**Neuro –Eye Disease :**Evaluation of optic nerve disease, Clinical features of optic nerve dysfunction, Optic disc changes, Optic atrophy, Special investigation, Classification of optic neuritis, Optic neuritis and demyelination, Systemic features of multiple sclerosis.

**Unit III**

**18 Hrs**

**Congenital Optic Nerve Anomalies:** Without neurological associations - Tilted disc, Optic disc drusen, Optic disc pit, Myelinated nerve fibers. With neurological associations - Optic disc coloboma, Morning glory anomaly, Optic nerve hypoplasia, Aicardi syndrome, Miscellaneous anomalies.

**Unit IV**

**18 Hrs**

**Pupillary Reaction :**Applied anatomy, Abnormal pupillary reactions, Afferent pupillary conduction defects, Argyll robertson pupils, Differential diagnosis of light-near dissociation, Adie pupil, oculomotor palsy (horner syndrome). **Supranuclear Disorder of Eye Movements** - Conjugate eye movements, Saccadic movements, Smooth pursuit movements & Non-optical reflexes.

**Unit V**

**18 Hrs**

**Ocular myopathies and related disorders:** Myasthenia gravis - Clinical features, Special investigations, Treatment. Ocular myopathies, Myotonic dystrophy - Systemic features, Ocular features. Essential blepharospasm - Clinical features, Treatment.

**Text Books:**

1. Essentials of Ophthalmology by Samar k Basak – 8<sup>th</sup> Edition.
2. Comprehensive Ophthalmology by A K Khurana - 4th edition, New age international (p) Ltd. Publishers, New Delhi.

**Reference Books:**

- ❖ Jack J. Kanski - *Clinical Ophthalmology: A Systematic Approach*, 6th edition, Butterworth-Heinemann, 2007
- ❖ Stephen J. Miller : *Parsons Diseases of the Eye*, 18th edition, Churchill Livingstone, 1990

## SEMESTER IV

### COURSE XVIII

#### (C24OP43 / E24OP13) CONTACT LENS, OPTICAL DISPERSING & LOW VISION AIDS

##### Unit I

18 Hrs

##### Lens materials:

glass, plastic, polycarbonate. Lens surfacing. Ophthalmic lens coating, Absorptive lenses, Impact resistant lenses, Lenses for the Aphakic patient, Aspheric lenses, Inspection of lens quality.

##### Unit II

18 Hrs

##### Spectacle frame:

Materials (Plastics, Metals), Types. Frame measurements: The boxing system, The datum system, Facial Measurement: The IPD, Visual axes. Measuring heights: Single Vision, Bi-focal, Progressive.

##### Unit III

18 Hrs

##### Contact lens:

Definition, Types, Parameters, Indications, Contraindications, Insertion and removal, Do's and Don'ts.

##### Unit IV

18 Hrs

Pre-fitting assessment, (Keratometry), Fitting, contact lens solutions, complications of using CL. Toric, cosmetic & therapeutic lenses.

##### Unit V

18 Hrs

##### Low Vision Aids:

Definition - Classification - Magnification - Low vision aids-optical, non optical and electronic devices.

##### Text Books:

1. Low Vision Aids Practice by Ajay Kumar Bhootra - 2 nd Edition, 2007.
2. Contact Lenses: Basics and Applications by P.S.Grewal.

##### Reference Books:

- ❖ M. Jalie: Principles of Ophthalmic Lenses, Edition 5, 2016
- ❖ C.V. Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996.
- ❖ Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA
- ❖ Ruben M Guillon: Contact lens practice, 994, 1st Edition

**SEMESTER IV**  
**COURSE XIX**  
**(C24OP44 / E24OP14) BINOCULAR VISION**

**Unit I**

**18 Hrs**

**Binocular Vision and Space perception** - Relative subjective visual direction, Retino motor value , Grades of BSV, SMP and Cyclopean Eye, Correspondence, Fusion, Diplopia, Retinal rivalry, Horopter, Physiological Diplopia and Suppression, Stereopsis.

**Unit II**

**18 Hrs**

**Anatomy of Extra Ocular Muscles** - Rectii and Obliques, LPS, Innervation & Blood Supply. Physiology of Ocular movements - Center of rotation, Axes of Fick, Action of individual muscle. Laws of ocular motility - Donder's and Listing's law, Sherrington's law, Hering's law. Uniocular & Binocular movements, fixation, saccadic & pursuits. Version & Vergence. Fixation & field of fixation.

**Unit III**

**18 Hrs**

**Binocular vision test** - Test for simultaneous macular perception, test for fusion, test for stereopsis - synoptophore or stereoscope test, vectograph test, titmus stereo test, random dot stereogram test, simple motor task test based on stereopsis.

**Unit IV**

**18 Hrs**

**Accommodation** - Definition and mechanism (process), Methods of measurement, Stimulus and innervations, Types of accommodation, Anomalies of accommodation. **Convergence** - Definition and mechanism, Methods of measurement, Types and components of convergence, Tonic, accommodative, fusional, proximal & Anomalies of Convergence.

**Unit V**

**18 Hrs**

**Suppression** - Investigations & Management **Abnormal Retinal Correspondence** - Investigation and management **Amblyopia** - Classification, Etiology Investigation & Management

**Text Books:**

1. Binocular Vision and Ocular Motility: Theory and Management of Strabismus by Guntant P. Bhatia.
2. Binocular Vision Anomalies: Investigation and Treatment by B. Sridhar.

**Reference Books:**

- ❖ *Theory and Practice of Squint and Orthoptics* by A K Khurana
- ❖ *R W Reading: Binocular Vision- Foundations and Applications*
- ❖ Basic Science, A.A.O (section-6) *Pediatric Ophthalmology and Strabismus* 1992-1993

## **SEMESTER IV**

### **COURSE XX**

#### **(C24OPPW / E24OPPW) PROJECT / INTERNSHIP**

##### **Objective:**

To improve the skills of Optometrist Clinical Internship should be conducted.

##### **Student Internship:**

They are going to well – reputed Institutes like Dr.Agarwal Eye Hospital, Lenskart & Dr.Anilkumar Eye Hospital, Sivakasi.

##### **Duration of Internship: Six Months**

##### **Submission Of Report:**

After Completion of their clinical Internship / training every student should be submit their report compulsory.

##### **Vivo – Voce:**

A Student Vivo – Voce should be conducted for their project marks.