



DIPLOMA IN OPTOMETRY TECHNICIAN

DURATION :- 3 YEARS

ELIGIBILITY :- 10TH

1ST YEAR

CODE	SUBJECT	MAX MARKS	CREDIT
101	OCULAR ANATOMY	100	4
102	OCULAR PHYSIOLOGY	100	4
103	OCULAR BIOCHEMISTRY	100	4
104	ENGLISH COMMUNICATION & SOFT SKILLS	100	3
105	PHYSICAL OPTICS	100	4
106	COMPUTER FUNDAMENTALS	100	3
107	PRACTICAL -I	100	3
108	CLINICAL POSTING	100	2

2ND YEAR

CODE	SUBJECT	MAX MARKS	CREDIT
201	GENERAL PATHOLOGY	100	4
202	VISUAL OPTICS	100	4
203	OPTOMETRIC OPTICS	100	4
204	OCULAR DISEASES	100	3
205	OCULAR MICROBIOLOGY	100	4
206	OPTOMETRIC INSTRUMENTS	100	3
207	PRACTICAL -II	100	3
208	CLINICAL POSTING	100	2

3RD YEAR

CODE	SUBJECT	MAX MARKS	CREDIT
301	GEOMETRICAL OPTICS	100	4
302	BASIC AND OCULAR PHARMACOLOGY	100	4
303	CONTACT LENS	100	4
304	BINOCULAR VISION	100	3
305	BIO MEDICAL WASTE MANAGEMENT	100	4
306	OCCUPATIONAL OPTOMETRY	100	3
307	PRACTICAL-III	100	3
308	CLINICAL POSTING	100	2

101 OCULAR ANATOMY

UNIT 1

- ☒ Central nervous system: A brief Introduction
- ☒ Spinal cord and brain stem
- ☒ Cerebellum and Cerebrum
- ☒ Embryology of the Eye

UNIT 2

- ☒ Orbit and adnexa
- ☒ Eye Ball

UNIT 3

- ☒ Eye Lid
- ☒ Conjunctiva
- ☒ Cornea
- ☒ Sclera
- ☒ Anterior chamber

UNIT 4

- ☒ Uvea
- ☒ Crystalline Lens

UNIT 5

- ☒ Vitreous
- ☒ Choroid
- ☒ Retina

REFERENCE BOOKS:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi,

102 OCULAR PHYSIOLOGY

UNIT 1

- ☒ Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe
- ☒ Extrinsic eye muscles, their actions and control of their movements
- ☒ Coats of the eye ball
- ☒ Cornea
- ☒ Aqueous humor and vitreous: Intra ocular pressure

UNIT 2

- ☒ Iris and pupil
- ☒ Crystalline lens and accommodation, Mechanism of accommodation – presbyopia
- ☒ Retina – structure and functions
- ☒ Vision – general aspects of sensation
- ☒ Pigments of the eye and photochemistry

UNIT 3

- ☒ The visual stimulus, refractive errors
- ☒ Visual acuity, Vernier acuity and principle of measurement
- ☒ Visual perception – Binocular vision, stereoscopic vision, optical illusions
- ☒ Visual pathway, central and cerebral connections
- ☒ Colour vision and colour defects. Theories and diagnostic tests

UNIT 4

- ☒ Introduction to electro physiology
- ☒ Scotopic and Photopic vision
- ☒ Color vision, Color mixing
- ☒ Retinal sensitivity and Visibility

UNIT 5

- ☒ Receptive stimulation and flicker
- ☒ Ocular, movements and saccades

- ☒ Visual perception and adaptation
- ☒ Introduction to visual psychology (Psychophysics)

REFERENCE BOOKS:

1. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 20012. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

103 OCULAR BIOCHEMISTRY

UNIT 1

Hormones basic concepts in metabolic regulation with examples say insulin

UNIT 2

Metabolism: General whole body metabolism (carbohydrates, proteins, lipids)

UNIT 3

Ocular Biochemistry: Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (The important chemicals in each and their roles.) Immunology of anterior segment

UNIT 4

Technique: Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry. Radio isotopes: application in medicine and basic research.

UNIT 5

Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their estimation.

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990
2. D R Whitehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

104 ENGLISH COMMUNICATION & SOFT SKILLS

UNIT-I: Introduction to English language

- a) Role and significance of English language in the present scenario
- b) English Language: Its relevance for the Indian industry
- c) Introduction to Listening, Speaking, Reading, Writing (LSRW) and benchmarking of the class

UNIT-II: Phonetics & Functional Grammar

- a) Pronunciation and daily usage correction (speak with differences between p/b, s/sh, f/ph, t/d, v/w sounds)
- b) Parts of speech, articles, tenses, verbs and modals
- c) Practice of daily use words, numerals and tongue twisters
- d) Vocabulary building, Construction of simple sentences: Basic sentence pattern, subject and Predicate

[Note: As part of classroom activity, language games, tongue & jaw exercises, simple passages from the newspapers for oral drills in the classroom and practice tests (written and oral)]

UNIT-III: English Communication- About Myself

- a) Let's talk, making conversation, meeting and greeting
- b) Introducing myself, my family and my friends
- c) My opinions, my likes and dislikes
- d) Life at college, hostel and workplace

[Note: As part of classroom activity, use the Workbook for reference for classroom and home assignments, carry out practice tests (written and oral)]

UNIT-IV: Personality Development

- a) First impression: Dressing sense, good manners, speaking well and respectably
- b) Positive Attitude: Being happy and alert, a good listener and a good friend
- c) Consultation among peers: Soliciting advice and giving advice
- d) Goal setting, confidence building & handling rejection

[Note: As part of classroom activity, refer Workbook for classroom and home assignments, carry out

105 PHYSICAL OPTICS

UNIT 1

Nature of light- light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. Sources of light; Electromagnetic Spectrum. Polarized light; linearly polarized light; and circularly polarized light

UNIT 2

Intensity of polarized light Malus' Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity

UNIT 3

Coherence- Interference; constructive interference, destructive interference; fringes; fringe width. Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc

UNIT 4

Resolution of an instrument, Telescope, for example), Raleigh's criterion, Scattering; Raleigh's scattering; Tyndall effect, Fluorescence and Phosphorescence

UNIT 5

Basics of Lasers, Coherence; population inversion; spontaneous emission; Einstein's theory of lasers. Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination; Trolands

REFERENCE BOOKS:

1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

106 COMPUTER FUNDAMENTALS

Unit-I

Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).

Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Unit-II

Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

Unit-III

Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Unit-IV

Introduction of Operating System: introduction, operating system concepts, types of operating

system, Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, Digital Token-Based, Electronic Payment Systems, Smart Card and Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk and Electronic Payment Systems.

Unit-V

Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

107 PRACTICAL-I

OCULAR ANATOMY PRACTICAL

1. Practical dissection of bull's eye
2. **Orbit:** Practical demonstration of orbital structure

OCULAR PHYSIOLOGY PRACTICAL

1. Lid movements
2. Tests for lacrimation tests
3. Extra ocular movements
4. Break up time
5. Pupillary reflexes
6. Applanation tonometry
7. Schiottz tonometry.
8. Measurement of accommodation and convergence
9. Visual acuity measurement.
10. Direct ophthalmoscopy
11. Indirect ophthalmoscopy
12. Retinoscopy
13. Light and dark adaptation.
14. Binocular vision(Stereopsis)

OCULAR BIOCHEMISTRY PRACTICAL

1. Quantitative analysis
2. Abnormal constituents in urine, sugar proteins, ketones, blood and bile salts.
3. Techniques of detection of abnormal constituents of urine:
4. Electrophoresis
 - a. Chromatography, Preparation of normal, molar and percentage solutions.
 - b. Preparation of buffers, pH determination
5. Demonstration
 - a. Estimation of blood cholesterol Estimation of alkaline phosphatase.
 - b. Salivary amylase (effect of ph, etc) Milk analysis

Practical: Basics of Computer

Computer fundamental and internet lab

1. Using basic DOS commands.
2. Using external DOS commands
3. Creating a email account
4. Using web browser for searching and surfing.
5. Creating and formatting a document in MS office
6. Using autocorrect, auto text and spell check operation in MS office .
7. Create tables in MS Word.
8. Inserting different kinds of object in MS word.
9. Use main merge options in MS office.
10. Create a Excel work sheet with following options rows and columns alignment..

11. Using excel formulas.
12. Create a graph with available data in MS excel.
13. Create a PPT presentation using auto content wizard.
14. Use Clip art animation effects and word art galleries in presentations.
15. Using transition and setting timings for slide show.
16. Use MS access to create data base and tables.

108 CLINICAL POSTING

The course provides students the opportunity to continue to develop confidence and increased skill in diagnosis and treatment delivery. Students will demonstrate competence in basic, intermediate and advance procedure in those areas. Students will participate in advance and specialized diagnostic and management procedure. Students will get practical experience of the knowledge acquired from geriatric and paediatric optometry courses. Hands-on experience under supervision will be provided in various outreach programmes namely, school vision screening, glaucoma and diabetic retinopathy screening etc., Students also get hand-on practical sessions on the following courses namely, contact lens, low vision care, geriatric optometry and paediatric optometry.

301 GENERAL PATHOLOGY

Unit I

Introduction & History of pathology, Basic definitions and familiarization with the common terms used in pathology, Causes and mechanisms of cell injury, reversible and irreversible injury, Introduction of hyperplasia, hypoplasia, hypertrophy, atrophy, metaplasia, necrosis and apoptosis

Unit II

General features of acute and chronic inflammation: Vascular changes, cellular events, Cells and mediators of inflammation, Phagocytosis and its mechanism

Unit III

Tissue Renewal and Repair, healing and fibrosis, cirrhosis, introduction of oedema, hyperaemia, congestion, haemorrhage, haemostasis, thrombosis, embolism, infarction, shock and hypertension.

Unit IV

Protein energy malnutrition, deficiency diseases of vitamins and minerals, nutritional excess and imbalances. Role and effect of metals (Zinc, Iron and Calcium) and their deficiency diseases, Aetiology and pathophysiology of diabetes, arteriosclerosis, myocardial infarction, respiratory diseases (COPD), Parkinson disease

Infectious Diseases: pathogenesis & overview of modes of infections, prevention and control with suitable examples like Typhoid, Dengue

Unit V

Cancer: Definitions, nomenclature, characteristics of benign and malignant neoplasm, metastasis, Carcinogens and cancer, concept of oncogenes, tumour suppressor genes, DNA repair genes and cancers stem cells.

REFERENCE BOOKS:

1. Corton kumar and robins: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.
2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

202 VISUAL OPTICS

UNIT- 1

- ☑Review of Geometrical Optics: Vergence and power
- ☑object space and image space
- ☑Sign convention
- ☑Spherical refracting surface

- ☒ Spherical mirror
- ☒ Cardinal points
- ☒ Magnification
- ☒ Light and visual function
- ☒ Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization.
- ☒ Spherical and chromatic aberration, application of chromatic aberration.

UNIT- 2

- ☒ Optics of Ocular Structure
- ☒ Cornea and aqueous
- ☒ Crystalline lens , Vitreous
- ☒ Schematic and reduced eye

UNIT-3

- ☒ Measurements of Optical Constants of the Eye
- ☒ Corneal curvature and thickness
- ☒ Keratometry
- ☒ Curvature of the lens and ophthalmophakometry
- ☒ Axis and angle of the eye

UNIT -4

- ☒ Basic Aspects of Vision
- ☒ Visual Acuity
- ☒ Light and Dark Adaptation
- ☒ Spatial and Temporal Resolution
- ☒ Science of Measuring visual performance and application to Clinical Optometry

UNIT- 5

- ☒ Refractive anomalies and their causes
- ☒ Etiology of refractive anomalies
- ☒ Population distributions of anomalies.
- ☒ Optical component measurements
- ☒ Growth of the eye in relation to refractive errors

REFERENCE BOOKS:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.

203 OPTOMETRIC OPTICS

UNIT -1

Introduction –Light, Mirror, Reflection, Refraction and Absorption Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms

UNIT- 2

Lenses –Definition, units, terminology used to describe, form of lenses
Vertex distance and vertex power, Effectivity calculations

UNIT -3

Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical
Transpositions –Simple, Toric and Spherical equivalent

UNIT- 4

Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinder lenses
Spherometer & Sag formula, Edge thickness calculations

UNIT -5

Magnification in high plus lenses, Minification in high minus lenses
Tilt induced power in spectacles
Aberration in Ophthalmic Lenses

REFERENCE BOOKS:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.

204 OCULAR DISEASES

UNIT-1

- ☒Orbit, Applied Anatomy
- ☒Proptosis (Classification, Causes, Investigations)
- ☒Enophthalmos
- ☒Lids-Applied Anatomy
- ☒Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)
- ☒Oedema of the eyelids(Inflammatory, Solid, Passive edema)
- ☒Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion ,Internalhordeolum, Molluscum Contagiosum)
- ☒Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).

UNIT- 2

- ☒Lacrimal System
- ☒Applied Anatomy
- ☒Tear Film
- ☒The Dry Eye (Sjogren's Syndrome)
- ☒Dacryocystitis & Dacryoadenitis

UNIT -3

- ☒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 -4

- ☒Cornea-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 (Arcus senilis, Vogt's white limbal girdle, Hassal-henle bodies, Band shaped keratopathy, Salzmann's nodular degeneration, Pellucid Marginal degeneration)
- ☒Dystrophies (Reis Buckler dystrophy,Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy)
- ☒Keratoconus, Keratoglobus

UNIT - 5

- ☒Uveal Tract and Sclera
- ☒Applied Anatomy,
- ☒Classification of uveitis-Etiology, Pathology, clinical features and management.
- ☒Endophthalmitis
- ☒Panophthalmitis
- ☒Pars Planitis
- ☒Episcleritis and scleritis
- ☒Clinical examination of Uveitis and Scleritis
- ☒Crystalline lens- Dislocation, opacification, subluxation and surgical management.

REFERENCE BOOKS:

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

205 OCULAR MICROBIOLOGY

UNIT -1

- ☒ Morphology and principles of cultivating bacteria

UNIT -2

- ☒ Sterilization and disinfections used in laboratory and hospital practice

UNIT- 3

- ☒ Common bacterial infections of the eye.

UNIT -4

- ☒ Common fungal infections of the eye

UNIT -5

- ☒ Common viral infections of the eye.
- ☒ Common parasitic infections of the eye.

REFERENCE BOOKS:

1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology
2. Sydney m. Finegold & ellen jo baron: Diagnostic Microbiology (DM)

206 OPTOMETRIC INSTRUMENTS

UNIT- 1

- ☒ Refractive instruments
- ☒ Test charts standards.
- ☒ Choice of test chart
- ☒ Trial case lenses
- ☒ Refractor (phoropter) head unit
- ☒ Trial frame design
- ☒ Near vision difficulties with units and trial frame
- ☒ Retinoscope – types available
- ☒ Adjustment of Retinoscopes- special features
- ☒ Objective optometers.

UNIT- 2

- ☒ Infrared optometer devices.
- ☒ Projection charts
- ☒ Illumination of the consulting room.
- ☒ Brightness acuity test
- ☒ Vision analyzer
- ☒ Pupilometer
- ☒ Potential Acuity Meter
- ☒ Abberometer

UNIT -3

- ☒ Ophthalmoscopes and related devices
- ☒ Design of ophthalmoscopes – illumination, Filters for ophthalmoscopy
- ☒ Indirect ophthalmoscope

UNIT -4

- ☒ Lensometer, Lens gauges or clock
- ☒ Slit lamp
- ☒ Tonometers
- ☒ Keratometer and corneal topography

UNIT - 5

- ☒ Refractometer
- ☒ Orthoptic Instruments (Synaptophore Only)
- ☒ Color Vision Testing Devices
- ☒ Fields of Vision And Screening Devices
- ☒ A Scans (Details)
- ☒ Only Short Introduction-
- ☒ B Scan, ERG, VEP, OCT

REFERENCE BOOKS:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002
2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

207 PRACTICAL-II

OPTOMETRIC OPTICS PRACTICAL

1. Measurement of lens power , lens centration using conventional techniques
2. Transposition of various types of lenses
3. Knowledge to identify different forms of lenses
 - a. (equi- convex, planoconvex, periscopic, etc.)
4. Knowledge to select the tool power for grinding process.
5. Measurement of surface powers using lens measure.
6. Method of laying off the lens for glazing process.

OPTOMETRIC INSTRUMENTS PRACTICAL

1. Hands-on practice of the all major ophthalmic Instrument

OCULAR DISEAS PRACTICAL

1. Visual Acuity chart/drum
2. Retinoscopy
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Biomicroscope
7. Tonometer: [Schiotz's, Applanation, Non Contact, Tonopen Tonometer,]
8. Keratometer
9. Lensometer
10. A - Scan Ultrasound
11. Color Vision [ishihara,]

208 CLINICAL POSTING

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a registered optometrist. Students are tested on intermediate clinical optometry skills. The practical aspects of the dispensing optics (hand-on in optical), optometric instruments, clinical examination of visual system (Hands-on under supervision) and ocular diseases (Slides and case discussion) will be given to the students during their clinical training.

301 GEOMETRICAL OPTICS

UNIT 1

Nature of light- light as electromagnetic oscillation; speed of light in vacuum and other media; Wavefronts spherical, elliptical and plane.

Reflection and refraction of light- laws of reflection and refraction. Total internal reflection.
Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles

UNIT 2

- ☒Plane mirror and spherical mirror- convex and concave mirror
- ☒Reflection by a spherical mirror
- ☒paraxial approximation; sign convention
- ☒Imaging by concave mirror and convex mirror
- ☒Reflectivity; transmissivity ; Snell's Law, Refraction at a plane surface Glass slab

UNIT 3

Definition of crown and flint glasses; materials of high refractive index

Prism- Angle of prism; deviation produced by a prism; refractive index of the prism , definition of Prism dioptre and application of prism.

Dispersion - Angular dispersion; dispersive power

UNIT 4

- ☒Vergence of light – convergence and divergence
- ☒Vergence at a distance formula ; effectivity of a refracting surface
- ☒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
- ☒Newton's formula
- ☒linear magnification; angular magnification

UNIT 5

- ☒Imaging by a thin convex lens and thin concave lens; image properties (real/virtual; erect/inverted magnified/minified) for various object positions
- ☒System of two thin lenses; review of front and back vertex powers and equivalent Power, review of six cardinal points.
- ☒System of more than two thin lenses; calculation of equivalent power using magnification formula

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA,1991.
2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

302 BASIC AND OCULAR PHARMACOLOGY

UNIT -1

General Pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factor modifying drug

UNIT- 2

Systemic pharmacology- ANS, drugs affecting pupillary size and light reflex,intraocular tension, Accommodation.

General & local anesthetics, Chemotherapy: Introduction on general chemotherapy, specific chemotherapy Antiviral, antifungal, antibiotics;steroids, Anti-diabetics; Blood Coagulants

UNIT 3

Ocular Pharmacology: Ocular preparations, Ocular pharmacokinetics, methods of drug administration and special drug delivery system, Ocular toxicology.

UNIT 4

Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedure Antiglaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal.

UNIT 5

Drugs used in allergic, inflammatory& degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes and anti-oxidants.

TEXT BOOK

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
3. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven,1997

303 CONTACT LENS

UNIT 1

- ☒ Introduction to Contact lenses
- ☒ Definition and Classification
- ☒ History of Contact Lenses
- ☒ Optics of Contact Lenses
- ☒ Magnification & Visual field
- ☒ Accommodation & Convergence
- ☒ Back & Front Vertex Power / Vertex distance calculation
- ☒ Review of Anatomy & Physiology of Tear film
- ☒ Cornea
- ☒ Lids & Conjunctiva

UNIT 2

- ☒ Introduction to CL materials
- ☒ Monomers, Polymers
- ☒ Properties of CL materials
- ☒ Physiological (Dk, Ionicity, Water content)
- ☒ Physical (Elasticity, Tensile strength, Rigidity)
- ☒ Optical (Transmission, Refractive index)
- ☒ Indications and contraindications
- ☒ Parameters / Designs of Contact Lenses & Terminology

UNIT 3

- ☒ 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

UNIT 4

- ☒ Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses
- ☒ Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses
- ☒ Calculation and finalising Contact lens parameters
- ☒ Ordering Rigid Contact Lenses – writing a prescription to the Laboratory
- ☒ Checking and verifying Contact lenses from Laboratory

UNIT 5

- ☒ Modifications possible with Rigid lenses
- ☒ Common Handling Instructions
- ☒ Insertion & Removal Techniques
- ☒ Do's and Dont's
- ☒ Care and Maintenance of Rigid lenses
- ☒ Cleaning agent & Importance
- ☒ Rinsing agents & Importance
- ☒ Disinfecting agents & importance
- ☒ Lubricating & Enzymatic cleaners
- ☒ Follow up visit examination
- ☒ Complications of RGP lenses

TEXT BOOKS:

1. IACLE modules 1 - 10
2. CLAO Volumes 1, 2, 3
3. Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006

304 BINOCULAR VISION

UNIT 1

- ☒ 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, Panum's area, BSV.
- ☒ Stereopsis and monocular clues - significance.
- ☒ Egocentric location, clinical applications.
- ☒ Theories of Binocular vision.

UNIT 2

- ☒ 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
- ☒ Sherrington's law
- ☒ Hering's law
- ☒ Unocular & Binocular movements - fixation, saccadic & pursuits.
- ☒ Version & Vergence.
- ☒ Fixation & field of fixation

UNIT 3

- ☒ Near Vision Complex Accommodation
- ☒ Definition and mechanism (process).
- ☒ Methods of measurement.
- ☒ Stimulus and innervation.
- ☒ Types of accommodation.
- ☒ Anomalies of accommodation – aetiology and management.

UNIT 4

- ☒ Convergence
- ☒ Definition and mechanism.
- ☒ Methods of measurement.
- ☒ Types and components of convergence - Tonic, accommodative, fusional, proximal
- ☒ Anomalies of Convergence – aetiology and management.
- ☒ Sensory adaptations
- ☒ Confusion

UNIT 5

- ☒ Suppression- investigation and management
- ☒ Blind spot syndrome
- ☒ Abnormal Retinal Correspondence
- ☒ Investigation and management
- ☒ Blind spot syndrome
- ☒ Eccentric Fixation-investigation and management
- ☒ Amblyopia-classification, etiology, investigations and management.

TEXT BOOKS:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Gunter K. V. Mosby Company

305 BIO-MEDICAL WASTE MANAGEMENT

Unit 1:

Present Scenario

Bio-medical waste – Concepts and Perceptions, Waste Generation, Segregation , Disposal

Unit 2:

Planning and Objectives of BMW Management, Survey, Policies and Perspectives of BMW Management

Unit 3:

Record Keeping, Management of Bio-medical Waste, Technologies for Treatment for BMW, Criteria for selecting appropriate Medical Waste Technologies

Unit 4:

Training, Occupational Safety and Health Issues

Unit 5:

Legal Aspects and Environment Concern, Implementation of Action Plan, Approaches to Common Regional facility

Reference Books:

1. The Book of Hospital Waste Management: Dr. D.B. Acharya & Dr. Meeta Singh (Minerva Press, New Delhi)
2. Hospital Waste Management & its Monitoring: Madhuri Sharma (Jaypee Brothers, Medical Publishers (PLtd. New Delhi)

306 OCCUPATIONAL OPTOMETRY

UNIT 1

Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. - Acts and Rules - Factories Act, WCA, ESI Act.

UNIT 2

Electromagnetic Radiation and its effects on Eye

Light – Definitions and units, Sources, advantages and disadvantages, standards

Color – Definition, Color theory, Color coding, Color defects, Color Vision tests

UNIT 3

Occupational hazards and preventive/protective methods

Task Analysis

UNIT 4

Industrial Vision Screening – Modified clinical method and Industrial Vision test

Vision Standards – Railways, Roadways, Airlines

UNIT 5

☑ Visual Display Units

☑ Contact lens and work

REFERENCE BOOKS:

1. G W Good: Occupational Vision Manual available in the following website: www.aoa.org
2. N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999
3. J Anshel: Visual Ergonomics Handbook, CRC Press, 2005
4. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008

307 PRACTICAL-III

GEOMETRICAL OPTICS PRACTICAL

1. Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index
2. Thin Prism – measurement of deviation; calculation of the prism diopter
3. Image formation by spherical mirrors
4. Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the Vergence formula
5. Concave lens – in combination with a convex lens – power determination

CONTACT LENS PRACTICAL

1. Measurement of Ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and TBUT
4. Schirmer's test, Slit lamp examination of tear layer
5. Keratometry
6. Placido's disc
7. Soft Contact Lens fitting – Aspherical
8. Soft Contact Lens fitting – Lathecut lenses
9. Soft Contact Lens over refraction

10. Lens insertion and removal
11. Lens handling and cleaning
12. Examination of old soft Lens
13. RGP Lens fitting
14. RGP Lens Fit Assessment and fluorescein pattern
15. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus)
16. RGP over refraction and Lens flexure
17. Examination of old RGP Lens
18. RGP Lens parameters
19. Slit lamp examination of Contact Lens wearers

BINOCULAR VISION PRACTICAL

1. Deals with hand-on session the basic binocular vision evaluation techniques.

308 CLINICAL POSTING

The course is the final series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship.