



SUMANDEEP VIDYAPEETH

An Institution Deemed to be University u/s 3 and 12B of UGC Act 1956
Accredited by NAAC with a CGPA of 3.61 on Four Point Scale at 'A++' Grade in Second Cycle
Category - I Deemed to be University under UGC Regulations 2018

At Post: Piparia, Taluka: Waghodia, District: Vadodara, Gujarat State, INDIA. Pin Code: 391760. Phone: +91 2668 245262 / 64 / 66, Fax No.: +91 2668 245069
Mobile No.: +91 8980809777, E-mail Id: registrar@sumandeepvidyapeethdu.edu.in, info@sumandeepvidyapeethdu.edu.in | Website: www.sumandeepvidyapeethdu.edu.in

Programme Syllabus

Name: Bachelor of Optometry (B. Optom)

Programme code: BOM001

I. Course of Instruction

Course Name	Course Code	Theory (In hrs.)	Practical (In hrs.) (Clinical)
First semester - Total Hours 212			
General Anatomy	BOP101	30	08
General Physiology	BOP102	30	06
General Biochemistry	BOP103	30	15
Geometrical Optics-I	BOP104	40	15
Nutrition	BOP105	15	08
English and Communication	BOP106	15	-
Total		160	52
Second semester - Total Hours 270			
Ocular Anatomy	BOP201	45	15
Ocular Physiology	BOP202	45	15
Ocular Biochemistry	BOP203	15	15
Physical Optics	BOP204	45	15
Geometrical Optics-II	BOP205	45	15
Total		195	75
Third semester - Total Hours 150			
Ocular Microbiology	BOP301	15	-
Visual Optics-I	BOP302	15	-
Optometric Optics-I	BOP303	45	-
Ocular Disease-I	BOP304	45	-
Clinical Examination of Visual System	BOP305	30	-
Total		150	-
Fourth semester - Total Hours 180			
Dispensing Optics	BOP401	45	-
Visual Optics-II	BOP402	30	-
Ocular Disease-II	BOP403	45	-
Pathology	BOP404	15	-
Basic and Ocular Pharmacology	BOP405	45	-
Total		180	-
Fifth semester - Total Hours 225			
Contact Lens-I	BOP501	30	30
Low Vision Care	BOP502	15	15
Geriatric and Pediatric Optometry	BOP503	45	-
Binocular Vision-I	BOP504	30	15



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Systemic Disease	BOP505	45	-
Total		165	60
Sixth semester - Total Hours 195			
Contact Lens –II	BOP601	30	30
Binocular Vision –II	BOP602	30	15
Public Health & Community Optometry	BOP603	30	-
Occupational Optometry	BOP604	15	-
Practice Management	BOP605	15	-
Research Methodology & Biostatistics	BOP606	-	30
Total		120	75
Seventh/ Eighth semester - Total Hours 780			
Clinical Internship-I	BOP701	30	720
Research Project-I	BOP701	30	-
Total		60	720
Eighth semester - Total Hours 780			
Clinical Internship-II	BOP801	30	720
Research Project-II	BOP802	30	-
Total		60	720

II. Scheme of Examination

Course	Course Code	Assessment (Internal)				Assessment (External)		
		Hours	Theory	Practical/ Viva	Total	Theory	Practical/ Viva	Total
First semester								
General Anatomy	BOP101	I(2hrs) E(3hrs)	30	20	50	50	50	100
General Physiology	BOP102	I(2hrs) E(3hrs)	30	20	50	50	50	100
General Biochemistry	BOP103	I(2hrs) E(3hrs)	30	20	50	50	50	100
Geometrical Optics-I	BOP104	I(2hrs) E(3hrs)	30	20	50	50	50	100
Nutrition	BOP105	I(2hrs) E(3hrs)	30	20	50	50	50	100
English and Communication	BOP106	I(2hrs) E(3hrs)	50	-	50	50	-	50
Total			200	100	300	300	250	500
Second semester								
Ocular Anatomy	BOP201	I(2hrs) E(3hrs)	30	20	50	50	50	100
Ocular Physiology	BOP202	I(2hrs) E(3hrs)	30	20	50	50	50	100



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Ocular Biochemistry	BOP203	I(2hrs) E(3hrs)	30	20	50	50	50	100
Physical Optics	BOP204	I(2hrs) E(3hrs)	30	20	50	50	50	100
Geometrical Optics-II	BOP205	I(2hrs) E(3hrs)	30	20	50	50	50	100
Total			150	100	250	250	250	500
Third Semester								
Ocular Microbiology	BOP301	I(2hrs) E(3hrs)	30	20	50	50	50	100
Visual Optics-I	BOP302	I(2hrs) E(3hrs)	30	20	50	50	50	100
Optometric Optics-I	BOP303	I(2hrs) E(3hrs)	30	20	50	50	50	100
Ocular Disease-I	BOP304	I(2hrs) E(3hrs)	30	20	50	50	50	100
Clinical Examination of Visual System	BOP305	I(2hrs) E(3hrs)	30	20	50	50	50	100
Total			150	100	250	250	250	500
Fourth Semester								
Dispensing Optics	BOP401	I(2hrs) E(3hrs)	30	20	50	50	50	100
Visual Optics-II	BOP402	I(2hrs) E(3hrs)	30	20	50	50	50	100
Ocular Disease-II	BOP403	I(2hrs) E(3hrs)	30	20	50	50	50	100
Pathology	BOP404	I(2hrs) E(3hrs)	30	20	50	50	50	100
Basic and Ocular Pharmacology	BOP405	I(2hrs) E(3hrs)	30	20	50	50	50	100
Total			150	100	250	250	250	500
Fifth Semester								
Contact Lens-I	BOP501	I(2hrs) E(3hrs)	30	20	50	50	50	100
Low Vision Care	BOP502	I(2hrs) E(3hrs)	30	20	50	50	50	100
Geriatric and Pediatric Optometry	BOP503	I(2hrs) E(3hrs)	30	20	50	50	50	100
Binocular Vision-I	BOP504	I(2hrs) E(3hrs)	30	20	50	50	50	100
Systemic Disease	BOP505	I(2hrs) E(3hrs)	30	20	50	50	50	100



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Total			150	100	250	250	250	500
Sixth Semester								
Contact Lens – II	BOP601	I(2hrs) E(3hrs)	30	20	50	50	50	100
Binocular Vision –II	BOP602	I(2hrs) E(3hrs)	30	20	50	50	50	100
Public Health & Community Optometry	BOP603	I(2hrs) E(3hrs)	30	20	50	50	50	100
Occupational Optometry	BOP604	I(2hrs) E(3hrs)	30	20	50	50	50	100
Practice Management	BOP605	I(2hrs) E(3hrs)	30	20	50	50	50	100
Research Methodology & Biostatistics	BOP606	I(2hrs) E(3hrs)	30	20	50	50	-	50
Total			180	120	300	300	250	550
Seventh Semester								
Clinical Internship-I	BOP701	-	-	100	100	-	100	200
Research Project-I	BOP702	-	-	100	100	-	100	200
Total			-	200	200	-	200	400
Eighth Semester								
Clinical Internship-II	BOP801	-	-	100	100	-	100	200
Research Project-II	BOP802	-	-	100	100	-	100	200
Total			-	200	200	-	200	400

❖ First Semester:

General Anatomy (30hrs)

- **Introduction to Human Anatomy:**
 - ♦ Anatomy: Definition and its relevance in medicine and optometry; planes of the body, relationship of structures, organ systems
 - ♦ Skeleton System
- **Tissues of the Body:**
 - ♦ Epithelium, connective tissue, bone, and cartilage
 - ♦ Embryology, histology, different types of each



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- ♦ Types of cells, cellular differentiation, and arrangements in different tissues

- **Muscles:**

- ♦ Different types of muscles, their functional differentiation, their relationship with different structures, and their neural supply

- **Blood Vessels:**

- ♦ Differentiation between arteries and veins, embryology, histology of both arteries and veins.

- **Skin and Appendages:**

- ♦ Embryology, anatomical differences in different areas
- ♦ Functional and protective variations, innervations, relationship with muscles and nerves.

- **Lymphatic System:**

- ♦ Embryology, functions, relationship with blood vessels and organs.

- **Glands:**

- ♦ Embryology, different types of glands (exocrine and endocrine)
- ♦ Functional differences, neural control of glands

- **Nervous System:**

- ♦ Parts of the nervous system, cell types of the nervous system, blood-brain barrier, reflex arc, peripheral nerves, spinal nerves, nerve fibers, autonomic nervous system.

- **Brain and Cranial Nerves:**

- ♦ Major parts of the brain, protective coverings of the brain, cerebrospinal fluid, brain stem, cerebellum, diencephalon, cerebrum, cranial nerves.

PRACTICAL (08 Hours): Practical demonstration of each organ using specimen. If specimen for certain organs are not available, then videos can be shown to make the student understand the anatomic structures.

General Physiology (30hrs)

- **Cell structure and organization:**

- ♦ Tissue organization
- ♦ General principles of cell physiology
- ♦ Physiology of smooth, skeletal & cardiac muscles

- **Blood:**

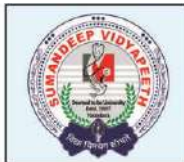
- ♦ Composition & functions of blood
- ♦ Hemopoiesis, RBCs, WBCs, Platelets & their functions.
- ♦ Blood groups, Rh factor, coagulation mechanism

- **Digestion:**

- ♦ Function of GIT
- ♦ Process of digestion, absorption & metabolism
- ♦ Functions of liver, pancreas & gall bladder

- **Nervous system:**

- ♦ Functions of CNS and PNS
- ♦ Reflex action, synaptic transmission, neurotransmitters
- ♦ Autonomic nervous system



- Sensory system:
 - ♦ Basic physiology of sense organs
 - ♦ Touch, pain & temperature perception

PRACTICAL (Total: 06 hours)

- Blood investigation:
 - ♦ Estimation of Hg
 - ♦ Blood grouping
- Nervous system
 - ♦ Testing of reflexes
 - ♦ Measurement of reaction time
- Muscle physiology:
 - ♦ Study of muscle physiology
 - ♦ Demonstration of reflex actions
- Cardiovascular system:
 - ♦ Measurement & recording of blood pressure
 - ♦ Measurement & recording of pulse rate
 - ♦ Demonstration of heart sounds using stethoscope

General Biochemistry (30hrs)

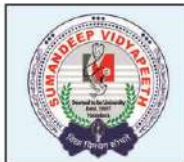
- Carbohydrates
- Proteins
- Lipids
- Vitamins
- Minerals

PRACTICAL (Total: 15 hours)

1. Reactions of monosaccharides, disaccharides and starch:

Glucose	Fructose
Galactose	Maltose, lactose
Sucrose	Starch
2. Analysis of Unknown Sugars Estimation:

Photometry	Bio fluid of choice – blood, plasma, serum
Standard graphs	Glucose
Proteins	Urea
Creatinine	Bilirubin



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Geometrical Optics-I (45hrs)

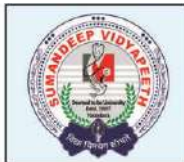
- Nature of light
- Wavefronts
- Refractive index
- Fermat's principle
- Snell's law
- Plane mirrors
- Reflection by spherical mirror
- Imaging by concave and convex mirror
- Prisms
- Crown and flint glass
- Refraction by spherical mirror
- Image formation by various lenses
- Magnification
- Cardinal points
- Prentice's rule

PRACTICAL (Total: 15 hours)

1. Thick Prism – determination of prism angle and dispersive power; calculation of 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.

Nutrition (15hrs)

- History of nutrition
- Food groups, RDA
- Balanced diet and diet planning
- Assessment of nutritional status



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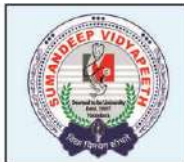
- Units of energy
- Measurement of energy and value of food
- Satiety value
- Energy expenditure
- Energy imbalance
- Limitations of daily food guide
- Protein sources and functions
- PEM and the eye
- Protein supplements
- Nitrogen balance
- Fat sources and functions
- Essential fatty acids
- Lipids and the eye
- Hyperlipidemia
- Minerals: Micro and macro
- Mineral deficiencies
- General functions of vitamins
- Vitamin deficiencies and associated eye diseases
- Nutrient with antioxidant
- Essential amino acids
- Measles and associated eye diseases, low birth weight

PRACTICAL (Total: 08 hours)

- Practical aspects of nutrition need to be covered.

English and Communication (15hrs)

- Basics of grammar
- Writing skills
- Writing and reading
- Introduction to communication
- Speaking
- Listening



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- Reading
- Non-verbal communication
- Communication in Optometry practice

❖ Second Semester:

Ocular Anatomy (45hrs)

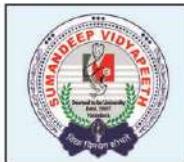
- Central nervous system
- Embryology of eye
- Orbit
- Ocular adnexa
- Sclera
- Cornea
- Aqueous humor
- Choroid
- Ciliary body
- Iris
- Lens
- Vitreous humor
- Retina

PRACTICAL (Total: 15 hours)

1. Eye: Practical dissection of bull's eye
2. Orbit: Practical demonstration of orbital structures.

Ocular Physiology (45hrs)

- 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
- Iris and pupil
- Crystalline lens and accommodation – presbyopia
- Retina – structure and functions
- Vision – general aspects of sensation
- Pigments of the eye and photochemistry
- The visual stimulus, refractive errors
- Visual acuity, Vernier acuity and principle of measurement
- Visual perception – Binocular vision, stereoscopic vision, optical illusions



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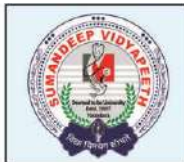
- Visual pathway, central and cerebral connections
- Colour vision and colour defects. Theories and diagnostic tests
- Introduction to electro physiology
- Scotopic and Photopic vision
- Color vision, Color mixing
- Mechanism of accommodation
- Retinal sensitivity and Visibility
- Receptive stimulation and flicker
- Ocular, movements and saccades
- Visual perception and adaptation
- Introduction to visual psychology (Psychophysics)

PRACTICAL: Total: 15 hours.

1. Lid movements
2. Tests for lacrimation tests
3. Extra ocular movements
4. Break up time
5. Pupillary reflexes
6. Applanation tonometry
7. Schiotz 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 (15hrs)

- Hormones basic concepts in metabolic regulation with examples say insulin.
- Metabolism: General whole body metabolism (carbohydrates, proteins, lipids)
- 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
- 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.
- Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their



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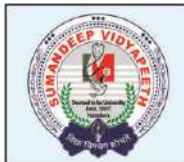
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estimation.

PRACTICAL (Total: 15 hours)

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
 - 4.1 Chromatography
 - 4.2 Preparation of normal, molar and percentage solutions.
 - 4.3 Preparation of buffers, pH determination
5. Demonstration
 - 5.1 Estimation of blood cholesterol
 - 5.2 Estimation of alkaline phosphatase.
 - 5.3 Salivary amylase (effect of pH, etc)
 - 5.4 Milk analysis.

Physical Optics (45hrs)

- 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.
- 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.
- Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
- Double slits, multiple slits, gratings.
- Diffraction; diffraction by a circular aperture; Airy's disc
- Resolution of an instrument (telescope, for example); Rayleigh's criterion
- Scattering, Tyndall effect.
- Fluorescence and Phosphorescence
- 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.

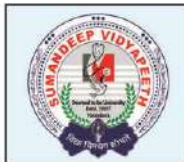
PRACTICAL: Total : 15 hours

Each practical session could be evaluated for 10 marks and the total could be added to the final evaluations. These practical could be customized as per the university requirements and spaced apart conveniently. The practical to be done include the following:

1. Gratings – determination of grating constant using Sodium vapour lamp; determination of wavelengths of light from Mercury vapour lamp
2. Circular Apertures – measurements of Airy's disc for apertures of various sizes
3. Verification of Malus' Law using a polarizer – analyzer combination
4. Demonstration of birefringence using Calcite crystals
5. Measurement of the resolving power of telescopes.
6. Newton's rings
7. Demonstration of fluorescence and phosphorescence using crystals and paints

Geometrical Optics-II (45hrs)

- Vergence and vergence techniques revised.
- Gullstrand's schematic eyes, visual acuity, Stiles Crawford
- Emmetropia and ametropia
- Blur retinal Imaginary
- Correction of spherical ametropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic
- Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.
- Aperture stops- entrance and exit pupils.
- Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.
- Accommodation –Accommodation formulae and calculations.



PRACTICAL: Total: 15 hours

1. Construction of a tabletop telescope – all three types of telescopes.
2. Construction of a tabletop microscope
3. Imaging by a cylindrical lens – relationship between cylinder axis and image orientation
4. Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations
5. Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation

❖ **Third Semester:**

Ocular Microbiology (15hrs)

- Morphology and principles of cultivating bacteria
- Sterilization and disinfections used in laboratory and hospital practice
- Common bacterial infections of the eye.
- Common fungal infections of the eye
- Common viral infections of the eye.
- Common parasitic infections of the eye.

Visual Optics-I (15hrs)

1. Review of Geometrical Optics: Vergence and power
 - 1.1 Conjugacy, object space and image space
 - 1.2 Sign convention
 - 1.3 Spherical refracting surface
 - 1.4 Spherical mirror; catoptric power
 - 1.5 Cardinal points
 - 1.6 Magnification
 - 1.7 Light and visual function



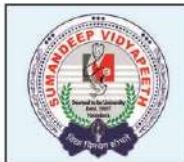
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- 1.8 Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Bi- refraction, Dichroism
- 1.9 Aberration and application Spherical and Chromatic
2. Optics of Ocular Structure
 - 2.1 Cornea and aqueous
 - 2.2 Crystalline lens
 - 2.3 Vitreous
 - 2.4 Schematic and reduced eye
3. Measurements of Optical Constants of the Eye
 - 3.1 Corneal curvature and thickness
 - 3.2 Keratometry
 - 3.3 Curvature of the lens and ophthalmophakometry
 - 3.4 Axial and axis of the eye
 - 3.5 Basic Aspects of Vision.
 - 3.5.1 Visual Acuity
 - 3.5.2 Light and Dark Adaptation
 - 3.5.3 Color Vision
 - 3.5.4 Spatial and Temporal Resolution
 - 3.5.5 Science of Measuring visual performance and application to Clinical Optometry
4. Refractive anomalies and their causes
 - 4.1 Etiology of refractive anomalies
 - 4.2 Contributing variability and their ranges
 - 4.3 Populating distributions of anomalies.
 - 4.4 Optical component measurements
 - 4.5 Growth of the eye in relation to refractive errors



Optometric Optics-II (45hrs)

1. Introduction –Light, Mirror, Reflection, Refraction and Absorption
2. Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms
3. Lenses –Definition, units, terminology used to describe, form of lenses
4. Vertex distance and vertex power, Effectivity calculations
5. Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical
6. Transpositions –Simple, Toric and Spherical equivalent
7. Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano- cylinder and Spherocylinderlenses
8. Spherometer & Sag formula, Edge thickness calculations
9. Magnification in high plus lenses, Minification in high minus lenses
10. Tilt induced power in spectacles
11. Aberration in Ophthalmic Lenses

Ocular Disease-I (45hrs)

1. Orbit
 - 1.1 Applied Anatomy
 - 1.2 Proptosis (Classification, Causes, Investigations)
 - 1.3 Enophthalmos
 - 1.4 Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)
 - 1.5 Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)
 - 1.6 Grave's Ophthalmopathy
 - 1.7 Orbital tumors(Dermoids, capillary haemangioma, Optic nerve glioma)
 - 1.8 Orbital blowout fractures
 - 1.9 Orbital surgery (Orbitotomy)
 - 1.10 Orbital tumors
 - 1.11 Orbital trauma
 - 1.12 Approach to a patient with proptosis



2. Lids

- 2.1 Applied Anatomy
- 2.2 Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)
- 2.3 Oedema of the eyelids(Inflammatory, Solid, Passive edema)
- 2.4 Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum)
- 2.5 Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).
- 2.6 Tumors (Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)

3. Lacrimal System

- 3.1 Applied Anatomy
- 3.2 Tear Film
- 3.3 The Dry Eye (Sjogren's Syndrome)
- 3.4 The watering eye (Etiology, clinical evaluation)
- 3.5 Dacryocystitis
- 3.6 Swelling of the Lacrimal gland(Dacryoadenitis)

4. Conjunctiva

- 4.1 Applied Anatomy
- 4.2 Inflammations of conjunctiva (Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis)
- 4.3 Degenerative conditions(Pinguecula, Pterygium, Concretions)
- 4.4 Symptomatic conditions(Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration)
- 4.5 Cysts and Tumors

5. Cornea

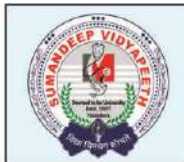
- 5.1 Applied Anatomy and Physiology
- 5.2 Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea)
- 5.3 Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative)
- 5.4 Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic))



- 5.5 Degenerations (classifications, Arcus senilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration)
- 5.6 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)
- 5.7 Keratoconus, Keratoglobus
- 5.8 Corneal oedema, Corneal opacity, Corneal vascularisation
- 5.9 Penetrating Keratoplasty
6. Uveal Tract and Sclera
 - 6.1 Applied Anatomy,
 - 6.2 Classification of uveitis
 - 6.3 Etiology
 - 6.4 Pathology
 - 6.5 Anterior Uveitis
 - 6.6 Posterior Uveitis
 - 6.7 Purulent Uveitis
 - 6.8 Endophthalmitis
 - 6.9 Panophthalmitis
 - 6.10 Pars Planitis
 - 6.11 Tumors of uveal tract(Melanoma)
 - 6.12 Episcleritis and scleritis
 - 6.13 Clinical examination of Uveitis and Scleritis

Clinical Examination of the Visual System (30hrs)

1. History taking
2. Visual acuity estimation
3. Extraocular motility, Cover test, Alternating cover test
4. Hirschberg test, Modified Krimsky
5. Pupils Examination
6. Maddox Rod
7. Van Herrick



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8. External examination of the eye, Lid Eversion
9. Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),
10. Color Vision
11. Stereopsis
12. Confrontation test
13. Photostress test
14. Slit lamp biomicroscopy
15. Ophthalmoscopy
16. Tonometry
17. ROPLAS
18. Amsler test
19. Contrast sensitivity function test
20. Saccades and pursuit test

❖ Fourth Semester:

Dispensing Optics (45hrs)

Spectacle Lenses - II:

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

Spectacle Frames:



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- Types and parts
- Classification of spectacle frames: material, weight, temple position, coloration
- Frame construction
- Frame selection
- Size, shape, mounting, and field of view of ophthalmic lenses

Tinted & Protective Lenses:

- Characteristics of tinted lenses, absorptive glasses
- Polarizing filters, photochromic & reflecting filters
- Safety lenses: toughened lenses, laminated lenses, CR 39, polycarbonate lenses

Multifocal Lenses:

- Introduction, history and development, types
- Bifocal lenses, trifocal & progressive addition lenses

Reflection from Spectacle Lens Surface & Lens Coatings:

- Reflection from spectacle lenses, ghost images, reflections in bifocals at the dividing line
- Antireflection coating, mirror coating, hard multi-coating (HMC), hydrophobic coating

Miscellaneous Spectacle:

- Iseikonic lenses
- Spectacle magnifiers
- Recumbent prisms
- Fresnel prism and lenses
- Lenticular & aspherical lenses
- High refractive index glasses

Components of Spectacle Prescription & Interpretation:

- Transposition, Add, and near power relation

Frame Selection:

- Based on spectacle prescription, professional requirements, age group, face shape

Measuring:

- Inter-pupillary distance (IPD) for distance & near, bifocal height

Lens & Frame Markings:

- Pupillary centers, bifocal heights, progressive markings & adjustments – facial wrap, pantoscopic tilt



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Recording and Ordering of Lenses:

- Power, Add, diameter, base, material, type, lens enhancements

Neutralization:

- Hand & lensometer, axis marking, prism marking

Faults in Spectacles:

- Lens fitting, frame fitting, patients' complaints, description, detection, and correction

Final Checking & Dispensing of Spectacles:

- Counseling on wearing & maintaining of spectacles
- Accessories – Bands, chains, boxes, sleeves, cleaners, screwdriver kit

Spectacle Repairs:

- Tools, methods, soldering, riveting, frame adjustments

Special Types of Spectacle Frames:

- Monocles
- Ptosis crutches
- Industrial safety glasses
- Welding glasses

Visual Optics-II (30hrs)

Accommodation & Presbyopia:

- Far and near point of accommodation
- Range and amplitude of accommodation
- Mechanism of accommodation
- Variation of accommodation with age
- Anomalies of accommodation
- Presbyopia
- Hypermetropia and accommodation

Convergence:

- Type, measurement, and anomalies
- Relationship between accommodation and convergence - AC/A ratio

Objective Refraction (Static & Dynamic):

- Streak retinoscopy



- Principle, procedure, difficulties, and interpretation of findings
- Transposition and spherical equivalent
- Dynamic retinoscopy: various methods
- Radical retinoscopy and near retinoscopy
- Cycloplegic refraction

Subjective Refraction:

- Principle and fogging
- Fixed astigmatic dial (Clock dial), combination of fixed and rotator dial (Fan and block test), J.C.C
- Duochrome test
 - Binocular balancing: alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging
 - Binocular refraction: various techniques

Effective Power & Magnification:

- Ocular refraction vs. spectacle refraction
- Spectacle magnification vs. relative spectacle magnification
- Axial vs. refractive ametropia, Knapp's law
- Ocular accommodation vs. spectacle accommodation
- Retinal image blur - depth of focus and depth of field

Ocular Disease-II (45hrs)

Retina and Vitreous:

- Applied Anatomy
- Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery)
- Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Viral, Mycotic)
- Retinal Vasculitis (Eales's)
- Retinal Artery Occlusion (Central Retinal Artery Occlusion)
- Retinal Vein Occlusion (Ischaemic, Non-Ischaemic, Branch Retinal Vein Occlusion)
- Retinal Degenerations: Retinitis Pigmentosa, Lattice Degenerations
- Macular Disorders: Solar Retinopathy, Central Serous Retinopathy, Cystoid Macular Edema, Age-Related Macular Degeneration
- Retinal Detachment: Rhegmatogenous, Tractional, Exudative



- Retinoblastoma
- Diabetic Retinopathy

Ocular Injuries:

- Terminology: Closed Globe Injury (Contusion, Lamellar Laceration), Open Globe Injury (Rupture, Laceration, Penetrating Injury, Perforating Injury)
- Mechanical Injuries (Extraocular Foreign Body, Blunt Trauma, Perforating Injury, Sympathetic Ophthalmitis)
- Non-Mechanical Injuries (Chemical Injuries, Thermal, Electrical, Radiational)
- Clinical Approach Towards Ocular Injury Patients

Lens:

- Applied Anatomy and Physiology
- Clinical Examination
- Classification of Cataract
- Congenital and Developmental Cataract
- Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic)
- Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar
- Management of Cataract (Non-Surgical and Surgical Measures; Preoperative Evaluation, Types of Surgeries)
- Complications of Cataract Surgery
- Displacement of Lens: Subluxation, Displacement
- Lens Coloboma, Lenticonus, Microspherophakia

Clinical Neuro-Ophthalmology:

- Anatomy of Visual Pathway
- Lesions of the Visual Pathway
- Pupillary Reflexes and Abnormalities (Amaurotic Light Reflex, Efferent Pathway Defect, Wernicke's Hemianopic Pupil, Marcus Gunn Pupil, Argyll Robertson Pupil, Adie's Tonic Pupil)
- Optic Neuritis, Anterior Ischemic Optic Neuropathy, Papilloedema, Optic Atrophy
- Cortical Blindness
- Malingering
- Nystagmus
- Clinical Examination

Glaucoma:

- Applied Anatomy and Physiology of Anterior Segment



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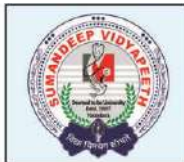
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- Clinical Examination
- Definitions and Classification of Glaucoma
- Pathogenesis of Glaucomatous Ocular Damage
- Congenital Glaucomas
- Primary Open-Angle Glaucoma
- Ocular Hypertension
- Normal Tension Glaucoma
- Primary Angle-Closure Glaucoma (Primary Angle-Closure Suspect, Intermittent Glaucoma, Acute Congestive, Chronic Angle-Closure)
- Secondary Glaucomas
- Management: Common Medications, Laser Intervention, and Surgical Techniques

Pathology (15hrs)

1. Inflammation and repair
2. Infection in general
3. Specific infections
 - 3.1 Tuberculosis
 - 3.2 Leprosy
 - 3.3 Syphilis
 - 3.4 Fungal infection
 - 3.5 Viral chlamydial infection
4. Neoplasia
5. Haematology
 - 5.1 Anemia
 - 5.2 Leukemia
 - 5.3 Bleeding disorders
6. Circulatory disturbances
 - 6.1 Thrombosis
 - 6.2 Infarction
 - 6.3 Embolism
7. Clinical pathology



7.1 Interpretation of urine report

7.2 Interpretation of blood smears.

8. Immune system

9. Shock, Anaphylaxis.

10. Allergy

Basic and Ocular Pharmacology (45hrs)

General Pharmacology:

- Introduction & sources of drugs
- Routes of drug administration
- Pharmacokinetics (emphasis on ocular pharmacokinetics)
- Pharmacodynamics & factors modifying drug actions

Systemic Pharmacology:

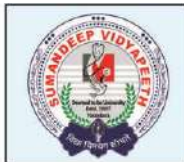
- **Autonomic Nervous System:** Drugs affecting pupillary size and light reflex, intraocular tension, accommodation
- **Cardiovascular System:** Anti-hypertensives and drugs useful in angina
- **Diuretics:** Drugs used in ocular disorders
- **Central Nervous System:** Alcohol, sedative hypnotics, general & local anesthetics, opioids & non-opioids
- **Chemotherapy:** Introduction on general chemotherapy, specific chemotherapy – antiviral, antifungal, antibiotics
- **Hormones:** Corticosteroids, antidiabetics
- **Blood Coagulants**

Ocular Pharmacology:

- Ocular preparations, formulations, and requirements of an ideal agent
- Ocular pharmacokinetics, methods of drug administration & special drug delivery systems
- Ocular toxicology

Diagnostic & Therapeutic Applications of Drugs Used in Ophthalmology:

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



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- Drugs used in allergic, inflammatory & degenerative conditions of the eye
- Immune modulators in ophthalmic practice
- Wetting agents & tear substitutes, antioxidants

❖ Fifth Semester:

Contact Lens-I (30hrs)

1. Introduction to Contact lenses
 - 1.1 Definition
 - 1.2 Classification / Types
2. History of Contact Lenses
3. Optics of Contact Lenses
 - 3.1 Magnification & Visual field
 - 3.2 Accommodation & Convergence
 - 3.3 Back & Front Vertex Power / Vertex distance calculation
4. Review of Anatomy & Physiology of
 - 4.1 Tear film
 - 4.2 Cornea
 - 4.3 Lids & Conjunctiva
5. Introduction to CL materials
 - 5.1 Monomers, Polymers
6. Properties of CL materials
 - 6.1 Physiological (Dk, Ionicity, Water content)
 - 6.2 Physical (Elasticity, Tensile strength, Rigidity)
 - 6.3 Optical (Transmission, Refractive index)
7. Indications and contraindications
8. Parameters / Designs of Contact Lenses & Terminology
9. RGP Contact Lens materials
10. Manufacturing Rigid and Soft Contact Lenses – various methods
11. Pre-Fitting examination – steps, significance, recording of results



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12. Correction of Astigmatism with RGP lens
13. Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses
14. Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses
15. Calculation and finalising Contact lens parameters
16. Ordering Rigid Contact Lenses – writing a prescription to the Laboratory
17. Checking and verifying Contact lenses from Laboratory
18. Modifications possible with Rigid lenses
19. Common Handling Instructions
 - 19.1 Insertion & Removal Techniques
 - 19.2 Do's and Don'ts
20. Care and Maintenance of Rigid lenses
 - 20.1 Cleaning agents & Importance
 - 20.2 Rinsing agents & Importance
 - 20.3 Disinfecting agents & importance
 - 20.4 Lubricating & Enzymatic cleaners
21. Follow up visit examination
22. Complications of RGP lenses



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PRACTICAL (Total: 30 hours)

1. Measurement of Ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and TBUT
4. Schrimers 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

Low Vision Care (15hrs)

1. Definitions & classification of Low vision
2. Epidemiology of low vision
3. Model of low vision service
4. Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision
5. Types of low vision aids – optical aids, non-optical aids & electronic devices
6. Optics of low vision aids
7. Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training
8. Pediatric Low Vision care
9. Low vision aids – dispensing & prescribing aspects



10. Visual rehabilitation & counseling
11. Legal aspects of Low vision in India
12. Case Analysis

PRACTICALS (Total: 15 hours)

1. Practical 1: Attending in low vision care clinic and history taking.
2. Practical 2:
 - 2.1 Determining the type of telescope and its magnification (Direct comparison method & calculated method)
 - 2.2 Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.
3. Practical 3:
 - 3.1 Inducing visual impairment and prescribing magnification.
 - 3.2 Determining reading speed with different types of low vision aids with same magnification.
 - 3.3 Determining reading speed with a low vision aid of different magnifications.

Geriatric and Pediatric Optometry (45hrs)

1. Structural , and morphological changes of eye in elderly
2. Physiological changes in eye in the course of aging.
3. Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)
4. Optometric Examination of the Older Adult
5. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye
6. Contact lenses in elderly
7. Pharmacological aspects of aging
8. Low vision causes, management and rehabilitation in geriatrics.
9. Spectacle dispensing in elderly – Considerations of spectacle lenses and frames



10. The Development of Eye and Vision
11. History taking Paediatric subjects
12. Assessment of visual acuity
13. Normal appearance, pathology and structural anomalies of
14. Orbit, Eye lids, Lacrimal system,
15. Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil
16. Lens, vitreous, Fundus Oculomotor system
17. Refractive Examination
18. Determining binocular status
19. Determining sensory motor adaptability
20. Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia
21. Remedial and Compensatory treatment of Strabismus and Nystagmus
22. Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics.
23. Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism
24. Spectacle dispensing for children
25. Paediatric contact lenses
26. Low vision assessment in children

Binocular Vision-I (30hrs)

1. Binocular Vision and Space perception.
 - 1.1 Relative subjective visual direction.
 - 1.2 Retino motor value
 - 1.3 Grades of BSV
 - 1.4 SMP and Cyclopean Eye
 - 1.5 Correspondence,
 - 1.6 Fusion, Diplopia, Retinal rivalry
 - 1.7 Horopter
 - 1.8 Physiological Diplopia and Suppression



- 1.9 Stereopsis, Panum's area, BSV.
- 1.10 Stereopsis and monocular clues - significance.
- 1.11 Egocentric location, clinical applications.
- 1.12 Theories of Binocular vision.
2. Anatomy of Extra Ocular Muscles.
 - 2.1 Rectii and Obliques, LPS.
 - 2.2 Innervation & Blood Supply.
3. Physiology of Ocular movements.
 - 3.1 Center of rotation, Axes of Fick.
 - 3.2 Action of individual muscle.
4. Laws of ocular motility
 - 4.1 Donder's and Listing's law
 - 4.2 Sherrington's law
 - 4.3 Hering's law
5. Uniocular & Binocular movements - fixation, saccadic & pursuits.
 - 5.1 Version & Vergence.
 - 5.2 Fixation & field of fixation
6. Near Vision Complex Accommodation
 - 6.1 Definition and mechanism (process).
 - 6.2 Methods of measurement.
 - 6.3 Stimulus and innervation.
 - 6.4 Types of accommodation.
 - 6.5 Anomalies of accommodation – aetiology and management.
7. Convergence
 - 7.1 Definition and mechanism.
 - 7.2 Methods of measurement.
 - 7.3 Types and components of convergence - Tonic, accommodative, fusional, proximal.
 - 7.4 Anomalies of Convergence – aetiology and management.
8. Sensory adaptations
 - 8.1 Confusion



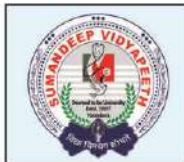
9. Suppression
 - 9.1 Investigations
 - 9.2 Management
 - 9.3 Blind spot syndrome
10. Abnormal Retinal Correspondence
 - 10.1 Investigation and management
 - 10.2 Blind spot syndrome
11. Eccentric Fixation
 - 11.1 Investigation and management
12. Amblyopia
 - 12.1 Classification
 - 12.2 Aetiology
 - 12.3 Investigation
 - 12.4 Management

Systemic Diseases (45hrs)

1. Hypertension
 - 1.1 Definition, classification, Epidemiology, clinical examination, complications, and management.
 - 1.2 Hypertensive retinopathy
2. Diabetes Mellitus
 - 2.1 Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications
 - 2.2 Diabetic Retinopathy
3. Thyroid Disease
 - 3.1 Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors
 - 3.2 Grave's Ophthalmopathy
4. Acquired Heart Disease
 - 4.1 Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm
 - 4.2 Ophthalmic considerations



5. Cancer :
 - 5.1 Incidence
 - 5.2 Etiology
 - 5.3 Therapy
 - 5.4 Ophthalmologic considerations
6. Connective Tissue Disease
 - 6.1 Rheumatic arthritis
 - 6.2 Systemic lupus erythematosus
 - 6.3 Scleroderma
 - 6.4 Polymyositis and dermatomyositis
 - 6.5 Sjogren syndrome
 - 6.6 Behcet's syndrome
 - 6.7 Eye and connective tissue disease
7. Tuberculosis
 - 7.1 Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.
8. Herpes virus (Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus)
 - 8.1 Herpes and the eye
9. Hepatitis (Hepatitis A, B, C)
10. Acquired Immunodeficiency Syndrome
11. Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations)
12. Common Tropical Medical Ailments
 - 12.1 Malaria
 - 12.2 Typhoid
 - 12.3 Dengue
 - 12.4 Filariases
 - 12.5 Onchocerciasis
 - 12.6 Cysticercosis
 - 12.7 Leprosy
13. Nutritional and Metabolic disorders:



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13.1 Obesity

13.2 Hyperlipidaemias

13.3 Kwashiorkor

13.4 Vitamin A Deficiency

13.5 Vitamin D Deficiency

13.6 Vitamin E Deficiency

13.7 Vitamin K Deficiency

13.8 Vitamin B1,B2, Deficiency

13.9 Vitamin C Deficiency

14. Myasthenia Gravis

15. First Aid

General Medical Emergencies

Preoperative precautions in ocular surgeries

16. Psychiatry

16.1 Basic knowledge of psychiatric condition and Patient Management

17. Genetics

17.1 Introduction to genetics

17.2 Organisation of the cell

17.3 Chromosome structure and cell division

17.4 Gene structure and basic principles of Genetics.

17.5 Genetic disorders and their diagnosis.

17.6 Genes and the eye

17.7 Genetic counseling and genetic engineering.

❖ Sixth Semester:

Contact Lens-II (30hrs)

1. SCL Materials & Review of manufacturing techniques
2. Comparison of RGP vs. SCL
3. Pre-fitting considerations for SCL
4. Fitting philosophies for SCL



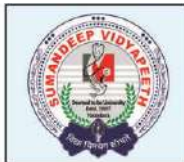
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5. Fit assessment in Soft Contact Lenses: Types of fit – Steep, Flat, Optimum
6. Calculation and finalising SCL parameters
 - 6.1 Disposable lenses
 - 6.2 Advantages and availability
7. Soft Toric CL
 - 7.1 Stabilization techniques
 - 7.2 Parameter selection
 - 7.3 Fitting assessment
8. Common Handling Instructions
 - 8.1 Insertion & Removal Techniques
 - 8.2 Do's and Dont's
9. Care and Maintenance of Soft lenses
 - 9.1 Cleaning agents & Importance
 - 9.2 Rinsing agents & Importance
 - 9.3 Disinfecting agents & importance
 - 9.4 Lubricating & Enzymatic cleaners
10. Follow up visit examination
11. Complications of Soft lenses
12. Therapeutic contact lenses
 - 12.1 Indications
 - 12.2 Fitting consideration
13. Specialty fitting
 - 13.1 Aphakia
 - 13.2 Pediatric
 - 13.3 Post refractive surgery
14. Management of Presbyopia with Contact lenses



PRACTICAL (Total: 30 hours)

1. Examination of old soft Lens
2. RGP Lens fitting
3. RGP Lens Fit Assessment and fluorescein pattern
4. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus)
5. RGP over refraction and Lens flexure
6. Examination of old RGP Lens
7. RGP Lens parameters
8. Fitting Cosmetic Contact Lens
9. Slit lamp examination of Contact Lens wearers
10. Fitting Toric Contact Lens
11. Bandage Contact Lens
12. SPM & Pachymetry at SN During Clinics
13. Specialty Contact Lens fitting (at SN during clinics)

Binocular Vision-II (30hrs)

1. Neuro-muscular anomalies
 - 1.1 Classification and etiological factors
2. History – recording and significance.
3. Convergent strabismus
 - 3.1 Accommodative convergent squint
 - 3.1.1 Classification
 - 3.1.2 Investigation and Management
 - 3.2 Non accommodative Convergent squint
 - 3.1.3 Classification
 - 3.1.4 Investigation and Management
4. Divergent Strabismus
 - 4.1 Classification
 - 4.2 A& V phenomenon
 - 4.3 Investigation and Management
5. Vertical strabismus
 - 5.1 Classification
 - 5.2 Investigation and Management



6. Paralytic Strabismus
 - 6.1 Acquired and Congenital
 - 6.2 Clinical Characteristics
7. Distinction from comitant and restrictive Squint
8. Investigations
 - 8.1 History and symptoms
 - 8.2 Head Posture
 - 8.3 Diplopia Charting
 - 8.4 Hess chart
 - 8.5 PBCT
 - 8.6 Nine directions
 - 8.7 Binocular field of vision
9. Amblyopia and Treatment of Amblyopia
10. Nystagmus
11. Non-surgical Management of Squint
12. Restrictive Strabismus
 - 12.1 Features
 - 12.2 Musculo-fascical anomalies
 - 12.3 Duane's Retraction syndrome
 - 12.4 Clinical features and management
 - 12.5 Brown's Superior oblique sheath syndrome
 - 12.6 Strabismus fixus
 - 12.7 Congenital muscle fibrosis
13. Surgical management

PRACTICAL (Total: 15 hours): Deals with hand-on session the basic binocular vision evaluation techniques.

Public Health and Community Optometry (30hrs)

1. Public Health Optometry: Concepts and implementation, Stages of diseases



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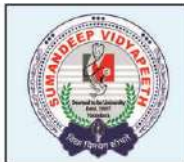
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2. Dimensions, determinants and indicators of health
3. Levels of disease prevention and levels of health care patterns
4. Epidemiology of blindness – Defining blindness and visual impairment
5. Eye in primary health care
6. Contrasting between Clinical and community health programs
7. Community Eye Care Programs
8. Community based rehabilitation programs
9. Nutritional Blindness with reference to Vitamin A deficiency
10. Vision 2020: The Right to Sight
11. Screening for eye diseases
12. National and International health agencies, NPCB
13. Role of an optometrist in Public Health
14. Organization and Management of Eye Care Programs – Service Delivery models
15. Health manpower and planning & Health Economics
16. Evaluation and assessment of health programmes
17. Optometrists role in school eye health programmes
18. Basics of Tele Optometry and its application in Public Health
19. Information, Education and Communication for Eye Care programs

Occupational Optometry (15hrs)

1. Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc.
 - 1.1 Acts and Rules - Factories Act, WCA, ESI Act.
2. Electromagnetic Radiation and its effects on Eye
3. Light – Definitions and units, Sources, advantages and disadvantages, standards
4. Color – Definition, Color theory, Color coding, Color defects, Color Vision tests
5. Occupational hazards and preventive/protective methods
6. Task Analysis
7. Industrial Vision Screening – Modified clinical method and Industrial Vision test
8. Vision Standards – Railways, Roadways, Airlines



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9. Visual Display Units

10. Contact lens and work

Practice Management (15hrs)

1. Business Management:

- 1.1 Practice establishment and development
- 1.2 Stock control and costing
- 1.3 Staffing and staff relations
- 1.4 Business computerization

2. Accounting Principles

- 2.1 Sources of finance
- 2.2 Bookkeeping and cash flow

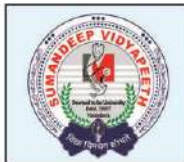
3. Taxation and taxation planning

4. Professionalism and Values

- 4.1 Professional values- Integrity, Objectivity, Professional competence and due care, confidentiality.
- 4.2 Personal values- ethical or moral values
- 4.3 Attitude and behaviour- professional behaviour, treating people equally
- 4.4 Code of conduct, professional accountability and responsibility, misconduct
- 4.5 Differences between professions and importance of team efforts
- 4.6 Cultural issues in the healthcare environment

Research Methodology and Biostatistics (30hrs)

- 1. Introduction to research methods
- 2. Identifying research problem
- 3. Ethical issues in research
- 4. Research design
- 5. Types of Data
- 6. Research tools and Data collection methods
- 7. Sampling methods
- 8. Developing a research proposal



9. Basics of Biostatistics

- Introduction of Biostatistics
- Measures of Morality
- Sampling
- Statistical significance
- Correlation
- Sample size determination.
- Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion.
- Theoretical distributions.
 - Binomial
 - Normal
 - Sampling –necessity of methods and techniques.
 - Chi. Square test (2 x 2)

10. Hospital Statistics

11. Use of computerized software for statistics

Research Project/ Dissertation (30hrs)

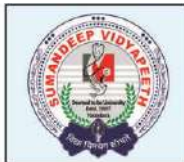
Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Student will get the experience of doing a research in systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing and presentation.

❖ Seventh Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis and management. Students will demonstrate competence in beginning, intermediate, and advanced procedures in above areas. Students will participate in advanced and specialized treatment procedures. Along with this students has to work upon their research project and thesis.

❖ Eighth Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis and management. Students will demonstrate competence in beginning, intermediate, and advanced procedures in above areas. Students will participate in advanced and specialized treatment procedures. Along with this students has to work upon their research project and thesis need to be submitted.



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Skills based outcomes and monitorable indicators for Optometrist

First year:

1. Role play
2. Clinical Observations
3. Vision Check
4. Basic Lensometry

Second year:

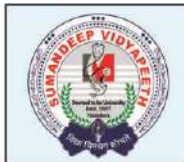
1. History taking
2. CEVS practical
3. Refraction Hands On including optical dispensing
4. Clinical Observations
5. Vision screening camps

Third year:

1. Clinical Observation
2. Hands-on under senior optometrists
3. Case reporting
4. Case discussion
5. Vision screening camps
6. Diagnostic interpretations

Internship:

- | | |
|----------------------|------|
| 1. Primary Eye Care | 25 % |
| 2. Dispensing Optics | 25 % |
| 3. Contact Lens | 10% |
| 4. Low Vision Aids | 10% |



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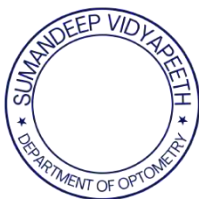
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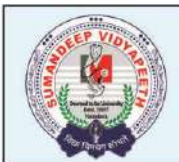
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5. Orthoptics	10%
6. Diagnostics	10 %
7. Anterior Segment clinic	5%
8. Posterior Segment Clinic	5%

Reference: Model Curriculum Handbook of Optometry by Ministry of Health and Family Welfare
Allied Health Section 2015-16.

Dr. Satwinder Singh
HOD
Department of Optometry, SVDU





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