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Premlila Vithaldas Polytechnic

Syllabus – Diploma in Ophthalmic Technology

SNDT Women's University

1, Nathibai Thackersey Road,

Mumbai 400 020

Revised – 2008

Principal
Premlila Vithaldas Polytechnic
SNDT Women's University
Sir Vithaldas Vidya Vihar,
Juhu Road, Santacruz (W),
Mumbai - 400 049.

PREMLILA VITHALDAS POLYTECHNIC - S.N.D.T. - MUMBAI 400 049

DIPLOMA IN OPHTHALMIC TECHNOLOGY

REVISED CURRICULUM

2008

PREMLILA VITHALDAS POLYTECHNIC
SNDT WOMENS' UNIVERSITY
JUHU ROAD, SANTACRUZ (W)
MUMBAI 400049

OBJECTIVES OF THE PROGRAMME

- To impart **quality technical education** in the field of Ophthalmic Technology.
- To develop **technical skills** in students in the area of optical sciences for services in optical outlets.
- To develop **professionalism** amongst budding ophthalmic technologists for clinical and surgical assistantship with ophthalmologists.
- To **orient the students to the changing needs** of the society in the field of Optometry and Ophthalmology.
- To develop a **spirit of community service** among students for social and economic development of the society in general.
- To identify students with **entrepreneurial qualities** and to inspire and train them to be self sufficient.

Department of Ophthalmic Technology
Revised Curriculum 2010

Semester I:

Paper Code	Subject	L	P/T	D	TP	TW Th+ Pr	PV	T	Credit
1001	Optometry & Visual Optics	4		2	50	50		100	4
1002	Ocular Anatomy	4		2	50	50		100	4
1003	Anatomy Physiology	4		2	50	50		100	4
1004	Physics	2	2	2	50	50+ 50	50	200	3
1005	Skills in Language and communication	4		2	50	50		100	4
1006	Yoga & stress management		2			50		50	1
	Total	**18**						**650**	**20**

Semester II:

Paper Code	Subject	L	P/T	D	TP	TW Th+ Pr	PV	T	Credit
2001	Optometry & Visual Optics	4	6	2	50	50+ 50	50	200	7
2002	Ocular Physiology	4		2	50	50		100	4
2003	Anatomy Pharmacology	2		2	50	50		100	2
2004	Mathematics & Statistics	4		2	50	50		100	4
2005	Computer Skills		4	2		50	50	100	2
2006	Personality Development		2			50		50	1
2007	Clinical Practice		6			50	50	100	3
	Total	**14**	**18**					**750**	**23**

Semester III:

Paper Code	Subject	L	P/T	D	TP	TW Th+ Pr	PV	T	Credit
3001	Optometry	4	6	2	50	50+50	50	200	7
3002	Clinical Ophthalmology I	3		2	50	50		100	3
3003	Contact lens I	3		2	50	50		100	3
3004	Orthoptics	2		2	50	50		100	2
3005	Ocular Pathology & Microbiology	4		2	50	50		100	4
3006	Entrepreneurship	2				50		50	1
3007	Clinical Practice		6			50	50	100	3
	Total	**16**	**14**					**750**	**23**

Semester IV:

Paper Code	Subject	L	P/T	D	TP	TW Th+ Pr	PV	T	Credits
4001	Optometry	4	6	2	50	50+ 50	50	200	7
4002	Clinical Ophthalmology II	3		2	50	50		100	3
4003	Contact lens II	3		2	50	50		100	3
4004	Research & Survey	3		2	50	50		100	3
4005	Clinical Practice		6			50	50	100	3
4006	Environmental Studies (EVS)	2			50	50		100	2
	Total	**15**	**12**					**700**	**21**

University Examination:

Semester IV- Theory	Marks	Credits
Optometry	100	4
Clinical Ophthalmology	100	3
Contact lens	100	3
Research & Survey	100	3
Total	**400**	**13**

Semester V:
Internship- Hospital Visit- 40 hrs/wk

Planning to propose & credits in the programme committee meeting to be held on 8/8/2014.

Semester VI:
Internship- Hospital Visit- 40 hrs/wk

University Examination

Semester VI- Practicals	Marks	Credits
Optometry	100	4
Clinical Ophthalmology	100	4
Project & Visual Optics	100	4
Total	**300**	**12**

Note:

- Semester V & VI internship
- University exams at the end of semester IV & VI respectively

Dr. Nita Jarmarwala
(HOD In-charge)

Updated Dec 2010

Principal, I/c.
Premlila Vithaldas Polytechnic
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Ophthalmic Technology
Sem I
Optometry and Visual Optics

No.	Topic & details	No. of lectures assigned	Weightage in %
1	**Optometry** Physical optics Nature of light Propagation of light Behaviour of light	4	5
2	Nature of white light Visible spectrum, colours, transparency etc.	2	3
3	International signs and symbols, standard notations of spherical and cylindrical lenses	2	4
4	Geometrical optics - Reflection of light Laws of reflection Reflection on the plane surface Types/ forms of reflection Reflection at curved surface i.e. concave and convex mirrors. Uses of concave and convex lenses	2	5
5	Refraction of light - Laws of refraction, Vergence and Dioptre, Refraction at the plane surface, Total Internal Reflection and Critical angle, Reflection at curved surfaces, Image formation, axial and paraxial objects.	2	5
6	Mathematical equation for - Image size, Image distance, Retinal image, Magnification	2	3
7	Exercise based on equations	4	5
8	Introduction to lenses forms and types – various types of lenses	4	10
9	Trial box and its accessories	8	10
1	**Visual Optic** Compound homocentric system -Reduced eye, schematic eye	2	2
2	Physiological Optics -General concepts of eye as a refracting apparatus, optical resolution of the eye, Vision Normal Vision, Visual Acuity, Various test types and charts (Distance & near). Measurement of visual acuity by various test types for physically and mentally handicapped children / Contrast Sensitivity & its measurements	4	5
3	Visual optics -Accommodation - Definition, Mechanism of accommodation, variation with Age,	4	10
4	Hypermetropia - Definition (with reference to far point), optics of a hypermetropic eye, Aetiology, Types, Accommodation in Hypermetropes,	4	10

	Treatment.		
6	Myopia – Defi5nition (with reference to far point), Aetiology, opti4cs of myopic eye, Types, Pathological Myopia, Accom2modation in Myopes, Treatment, Surgical Treatme2nt- Lasik (mention).	4	10
7	Astigmatism - Definition, Types, Aetiology, Treatment, Irregular Astigmatism, Mention- Palcido's Disc, Keratometer, Topographer.	4	5
8	Aphakia - Definitions, causes, sign & symptoms optical condition, disadvantages, Treatment	2	4
9	Anisometropia - Definition, Aetiology, causes, Optical Diagrams, Retinal image difference, Treatment.	4	2
10	Role & significance of Cycloplegics & Mydriatic drugs in Ophthalmic Practice	2	2
	Total	**60 hrs**	**100**

Sem I

Ocular anatomy

No.	Topics and Details	No of lectures assigned	Weightage in %
1	Introduction to anatomy – common terms used.	2	5
2	Outline of eyeball structures and orbit .Cross section of eyeball, parts of eyeball, layers, eyeball in orbit	4	5
3	Orbit and its relations- External anatomy, measurements, orbital margins, roof of the orbit, relations, medial wall, floor, lateral wall, superior orbital fissure, inferior orbital fissure, optic foramen, orbital contents, blood supply, Tenon's capsule.	3	5
4	Extra-Ocular muscles-Extrinsic muscles of the eye, actions of the extraocular muscles, superior rectus, inferior rectus, medial rectus, lateral rectus, superior oblique, inferior oblique, muscles of the lids – levator palpebrae superiors, non- striated muscles of the orbit.	3	8
5	Lacrimal apparatus-Lacrimal glands, blood supply, nerve supply, lacrimal passage, lacrimal puncta, lacrimal canaliculi, lacrimal sac, nasolacrimal duct, blood supply of lacrimal passage, nerve supply of lacrimal passage.	3	5
6	Eyelids - External anatomy, structure of lids – skin, striated muscle, fibrous layer, tarsal plates, orbital septum, layer of unstriped muscle, conjunctiva, glands of the lids, blood supply of lids, nerve supply.	3	8
7	Conjunctiva – external anatomy. Palpebral conjunctiva, bulbar conjunctiva, fornix, microscopic structure, glands of conjunctiva, blood supply, caruncle, plica semilunaris.	2	5
8	Cornea -External anatomy, microscopic structure, blood supply, nerve supply, limbus.	4	8
9	Sclera -External anatomy, anterior apertures, middle apertures, posterior apertures, episclera, sclera proper, lamina fusca, blood supply, nerve supply.	2	5
10	Uvea -External anatomy, Iris, anterior limiting layer, stroma, anterior epithelium, posterior pigment epithelium, nerve supply of iris, ciliary body, ciliary processes, ciliary muscle, stroma, epithelium, internal limiting membrane, nerve supply of ciliary body, choroids, suprachoroidal lamina, layer of blood vessels, choriocapillaris, Bruch's membrane, nerve supply of choroids, blood supply of uveal tract.	4	7
11	Lens - External anatomy, lens capsule, lens epithelium, lens fibres, lens nuclei, ciliary zonule.	4	7
12	Anterior chamber and its angle -External anatomy, angle, and ciliary band, scleral spur, trabecular meshwork, canal of schlemm, Schwalbe's line, drainage of aqueous humor,	4	6

	posterior chamber.		
13	Posterior chamber and Vitreous -External anatomy, main mass of vitreous, base of vitreous, Hyaloidean vitreous, vitreous cells.	2	2
14	Retina- Layers, macula, ora serrata, blood supply, retinal capillaries.	4	5
15	Optic Nerve -Parts of the nerve, scleral canal, lamina cribrosa, sheaths of the nerve	3	4
16	Visual Pathway -Optic chaisma relations, arrangement of visual fibres in the optic chaisma, optic tract relations, lateral geniculate body, optic radiation, visual cortex, blood supply of the visual pathway, blood supply of the optic nerve, chaisma, optic tract, LGB, optic radiation, visual cortex, localization of lesions in the visual pathway.	3	4
17	Sympathetic and Parasympathetic innervations and its effect on the eye.	2	2
18	Blood supply- Ciliary circulation, retinal circulation, and central retinal artery.	2	2
19	Orbital Nerves -Oculomotor nerves, trochlear nerve, trigeminal nerve, abducent nerve, facial nerve.	1	2
20	Age changes- Eyelids, cornea, conjunctiva, lens, vitreous, retina and choroid	2	2
21	Congenital Anomalies of the eye and its adnexa - Pathology of congenital ocular anomalies - Anophthalmos, micro ophthalmos, ptosis, distichiasis, coloboma, epicanthus, corneal opacities, magalocornea, heterochromia iridis, aniridia, congenital cataract, pupil, choroid and retinal anomalies	2	2
22	Embryology.	1	1
	Total	**60 hrs**	**100**

Sem I

Anatomy and Physiology

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Cell -Cell membrane, cytoplasm, nucleus, non –living cell inclusions, membrane junctions, passage of solution through the cell membrane	2	10
2	Cell division -Mitosis, Meiosis	2	5
3	Biochemistry –Water, carbohydrates, Proteins, lipids, Nucleic Acids, structure of DNA & RNA, Enzymes, Hormones, Metabolism,	2	5
4	Tissues –Definition, Types, and functions.	10	10
5	Human skeleton - Functions, Skeleton system Axial skeleton, Appendicular Skeleton	4	5
6	Locomotion -Joints – definition, types, Muscle movements	2	5
7	Nervous system -CNS - Meninges, Ventricular system, cerebrospinal fluids, Lumbar puncture, Brain, Spinal Cord, Peripheral nervous system – spinal nerves, Cranial nerves, Autonomic nervous system – sympathetic nervous system, Parasympathetic nervous system	10	10
8	Special sense organ -Tongue and taste, Nose and smell, ear and hearing, Skin and Touch,	4	10
9	Respiratory system -Respiratory tract, Respiratory organs, physiology,	2	5
10	Cardiovascular system -Heart, Blood vessels- arteries and Veins, Physiology	4	10
11	Gastro – Intestinal system – The Alimentary canal, the associated glands, Phases of digestion, Physiology of digestion,	4	5
12	Excretory system -Organs, kidney, Urinary tract, physiology of excretion or urine formation	2	5

13	Endocrine system -Control of Hormone secretion, Pituitary gland, hypothalamus Thyroid Glands, Parathyroid Gland, Pancreas, Adrenal or Supra renal glands, Gonads (testes and ovary), Function of hormones	4	10
14	Reproductive system -Male reproductive system, female reproductive system, the menstrual cycle, Gametes, Embryonic development	8	5
	Total	**60 hrs**	**100**

Sem I

Physics

Theory

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Physics of Light (physical optics) - Electromagnetic spectrum, Propagation of light, X-rays, ultra violet rays, Infra- red rays (details, range, uses, and properties)	4	10
2	Properties of light (phenomena of light) - Reflection of light – Definition, Laws, reflection at plane & curved surface, types of reflection, image formation by convex & concave mirrors, sign convention, magnification (equation), Uses of mirrors.	5	15
3	Refraction - Definition, laws, refraction through glass slab, concave & convex lens. Refractive index of material, image formation by convex and concave lenses. Magnification (equation), Sign convention, critical angle and total internal reflection, and optical fibers.	5	20
4	Polarisation- Definition, polarized/ unpolarised light. Optical activity and optical active substance, Specific rotation, Polarimeter (construction, use)	2	15
5	Diffraction - definition	3	10
6	Prisms - Definition, Refraction through Prism. Angle and minimum angle of deviation of prism, I-δ curve for prism, Refractive index of prism (only formula)	1	10
7	Dispersion of light -White light, Dispersion through prism, Angular dispersion/ dispersive power.	3	5
8	Introduction to heat -Concept, units. Measurement of temperature, various types of thermometers. Latent heat (different definitions	3	10
9	Introductory information about Laser - Optics of Lasers, Use of Laser in medicine.	3	5
	Total	**30 hrs**	**100**

Sem I

Physics

Practical

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Verneire Calipers	4	15
2	Screw Gauge	4	15
3	Verification of laws of reflection	4	10
4	Verification of laws of refraction	2	10
5	"μ" by real and apparent depth method	2	5
6	"μ" of liquid by using a concave mirror	2	5
7	"F" focal length of concave mirror by u-v method	4	15
8	Focal length of convex lens by u-v method	2	10
9	I-δ curve for prism	2	5
10	"μ" of the material of the prism	2	5
11	Measurement of resistance of the given coil using ohm*s law	2	5
	Total	**30 hrs**	**100**

Sem I

Mathematics and Statistics

No.	Topics and details	No. of lectures assigned	Weightage in %
1	**Trigonometry** ➢ Angles and their measurements ➢ Trigonometric ratios of any angle ➢ Fundamental identities ➢ Trigonometric ratios of compound angles ➢ Addition and substraction theorems ➢ Product formulae ➢ Sum or difference form ➢ Multiple and submultiple angles ➢ Inverse trigonometric functions	20	32
2	**Co ordinate geometry** ➢ Rectangular co ordinate system ➢ Distance formula ➢ Section formula ➢ Slope and intercept of a line ➢ Various equations of a line ➢ Angle between two straight lines ➢ Parallel and perpendicular lines ➢ Various equations of a circle ➢ Centre and radius of a circle ➢ Tangent and normal to a circle.	20	38
3	**Statistics** ➢ Collection of data ➢ Organization of data ➢ Diagrammatic representation ➢ Graphical representation ➢ Measures of central tendency – Arithmetic mean, median, mode ➢ Measure of depression ➢ Mean deviation, standard deviation ➢ Coefficient of variation.	20	30
	Total	**60hrs**	**100**

Sem I

Skills in Language Communication

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	Communication theory – Need, methods, channels, barriers	10	10
2	Writing skills Comprehension passages – listening, reading, answering short questions, vocabulary Paragraph writing (with outlines). Letter writing – Informal letters on different situations, Formal letters – applications, answering advertisements Business communication (only theory) Summary writing	10	15
3	Grammar - Parts of speech, Phrases, clauses, sentences, Tenses Transformation of sentences– affirmative, negative, interrogative, exclamatory Direct and indirect speech Punctuation Verb – subject agreement Correction of sentences	15	25
4	Vocabulary - synonyms, antonyms, changing words from one part ofspeech to another	10	20
5	Spoken English – dialogue, description of an event, short prepared speeches on general topics	15	30
	Total	**60 hrs**	**100**

Sem I

Yoga and Stress Management

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Introduction to yoga – meaning, purpose	2	4
2	Paths of yoga ➢ Karma yoga ➢ Bhaktiyoga ➢ Hathyoga ➢ Asthangyoga	4	10
3	Pranayam	4	10
4	Physiological knowledge	2	8
5	Meditative and Cultural Asanas	2	8
6	Positive thinking, Negative thinking	4	10
7	Good posture	2	10
8	Asanas	2	10
9	Diet	2	10
10	Personal hygiene	2	10
11	Counseling and handling stress.	4	10
	Total	**30 hrs**	**100**

Optometry

Theory

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	Geometrical Optics - Introduction Dimension of lenses Lens surfaces and power Aberrations of the eye Introduction to the optical material Ideal or Best form lens and their difficulties Forms, Functions and uses of Spectacle lenses.	8	14
2	Refraction through Spherical Lens. Cylindrical lens. Sphero-Cylindrical lenses with reference to Sturm conoid.	4	5
3	Prism-Introduction to parts and Definitions Nomenclature Refraction through prism along with derivation $\angle A + \angle B = \angle i + \angle e$ Minimum Deviation2 Functions and Uses 1of prisms	2	5
4	Physiological Optics Verification of refractive status. Retinoscopy, methods, principles and application Types of Retinoscope Retinoscopy in Emmetropia , Ammetropia, Hypermetropia,Aphakia, Myopia, astigmatism	8	20
5	Prisms Nomenclature Combination of prisms Parts and Prism- Lens relationship Base-apex line difference Prism Base Setting	2	2
6	Transposition and its forms	2	2
7	Spectacle Frames Introduction to Basic frame materials. Parts of the Frame and function. Frame- Nomenclature. Measurements of frame. Dimensions of frames.	4	2

	Classifications.		
1	**Visual Optic** Errors of refraction and Binocular function. Accommodation - Types, anomalies of accommodation, inertia, excess, spasm, insufficient, ill -sustained, accommodation in Myopes, Emmetropes, Accommodation in small children	6	10
2	Convergence - Definition, meter angle, types of convergence, measurement of near point of accommodation. Convergence with RAF, anomalies of convergence, excess, in sufficiency / Divergence	4	10
3	Presbyopia - Definition, optical condition, cause, amplitude of accommodation, Age – graph, Treatment	2	10
4	Review of optical treatment of myopia & hypermetropia	6	10
5	Ophthalmic Procedures Subjective Examination with Pinhole. Stenopaeic Slit Astigmatic Fan Duochrome Test Jackson's Cross Cylinder	12	10
	Total	**60 hrs**	**100**

Sem II

Optometry

Practical

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Introduction and Study of trial lens box	12	15
2	Recording of visual acuity	12	15
3	Identification and neutralization of lenses	18	30
4	Introduction and study of spectacle frames	12	10
5	Retinoscopy on Practice Eye with spherical refractive error programme	12	10
6	Retinoscopy with Practice Eye-Cylindrical refractive error programme	12	10
7	Spectacle Correction for Ammetropia. (Spectacle prescription writing).	12	10
	Total	**90 hrs**	**100**

Sem II

Ocular Physiology

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	Visual Acuity -Definition, visual Angle, Components of Visual acuity, Factors affecting Visual Acuity Measurement of Visual acuity, Contrast sensitivity	4	5
2	Extra ocular Muscles & Ocular Motility -Physiology of Ocular Motility, Position of Gaze, Agonists, Synergists, Antagonists, & Yoke muscles, Herring's Law, Sherrington's Law, Ocular movements – Monocular Eye movements, Binocular Eye movements, versions, Vergence, convergence, divergence.	5	5
3	Eyebrows & Eyelids –Physiology of eyelid movements, Blinking, Reflex blinking, Blepharospasm, Bell's Phenomenon.	3	2
4	Corneal Physiology –Biochemical composition of Cornea, Metabolism of Cornea, Corneal transparency, Drug penetrating across the cornea,	5	8
5	Scleral Physiology -Biochemical Composition, Corneal lamella versus scleral lamella	2	2
6	Tear Film -Function, Structure, Physical properties,, Chemical Composition of tear, tear film Dynamics, Tear film Abnormalities, tests for tear film adequacy, Schirmer's test, BUT, Rose Bengal Staining, Vital Staining, Fluorescein Staining, Tear Evaporation Rate, Lacrimation, Epiphora, Jones dye test, Dacryosytography.	5	9
7	Aqueous humour & Intra Ocular Pressure- Formation of Aqueous, Aqueous outflow system, Maintenance of IOP, Biochemical Composition of Aqueous humour, Factors affecting Composition of Aqueous, Clinical application of blood –ocular barrier, breakdown of blood aqueous barrier, circulation &	6	8

	drainage of aqueous humour, features of normal IOP, factors affecting IOP, Measurement of IOP, and Tonometry		
8	Lens & Accommodation- Biochemical Composition of Lens, Metabolic Activities Of Lens, Lens Transparency, Changes in ageing lens, mechanism of accommodation, Age related changes in Accommodation.	5	10
9	Vitreous Humour –Biochemical Composition, Physiochemical properties, Blood vitreous barrier	2	4
10	Retina, Visual pathway & Physiology of Vision, Blood retinal Barrier. Physiology Of vision Visual perception Photochemistry of vision- vitamin A, Visual Pigments, Visual cycle. Electro physiology of Retina & Visual Pathway- ERG, EOG, VEP	3	5
11	Pupil -Light Reflex, Pathway of Light Reflex, near reflex, Pathology of Convergence reflex, Pathway of accommodation reflex, Lid Closure reflex, Pharmacology of the pupil- Miotics, Mydriatic, Abnormalities of Pupillary reflexes	5	10
12	Visual Adaptation –Light Minimum, Dark Adaptation, and Dark Adaptation curve, Light Adaptation	3	8
13	Colour Vision -Mechanism of Colour vision, Normal Colour attributes, Colorblindness	4	10
14	Entoptic Phenomena -Entoptic Visualization of Opacities in Ocular media, Entoptic phenomena related with tear film, Cornea, lens & Vitreous. Entoptic visualization of retinal vessels and retinal capillary circulation, Haloes.	2	2
15	Physiology of Binocular Vision -Grades of Binocular vision – SMP, Fusion, Steropsis, Advantages of Binocular Vision, Corresponding points &normal retinal correspondence, Horopter, Physiologic Diplopia, binocular Fusion, Panum's area, depth perception, Development of Binocular Vision, Amblyopia, Abnormal retinal correspondence.	5	10

16	Ocular Circulation -Structural characteristic of Ocular vessels.	1	2
	Total	**60 hrs**	**100**

Sem II

Ocular Pharmacology

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	General pharmacology - Definition, The nature and sources of drugs, Routes of drug administration, Types of parental routes, Absorption and bioavailability of a drug, Factors affecting drug absorption and it's bioavailability, Distribution of a drug, Fate of the drug, Drug excretion, Methods of prolonging the duration of action of a drug, Site of drug action, Drug receptors, Mechanism of action of a drug, adverse drug reactions, Drug toxicity, Factors modifying the effect of a drug,	6	15
2	Analgesics-antipyretic and NSAIDS - Analgesics, Opioid Analgesics, Non- Opioid Analgesics. NSAIDS, Classification of NSAIDS	2	5
3	Antihistaminic drugs Histamine, H receptor antagonists, Antihistamine or anti allergic- Pharmacological actions, Absorption, Fate and Excretion, Adverse reaction, Therapeutic uses, Common Antihistamines	2	5
4	Anesthesia - General anesthetics- Classification, Site and Mechanism of action, Pre-anesthetic medication Local anesthetics- mechanism of action, adverse reactions, Therapeutic uses	2	5
5	Chemotherapeutic agents - Sulfonamides, Fluoroquinolones, Antibiotic - Antibiotics effective mainly against Gram- positive organism, Gram-negative organism, Therapeutic uses, Antibiotics effective mainly against Gram positive organism & Gram negative organism, Antibiotics effective mainly against, Gram positive organism, Gram negative organism, Rickettsiae and Chlamydia, Antibiotics effective against acid –fast bacilli, Antibiotics effective against fungi, Antiseptics - Sterilization, Disinfections, Antiseptic, Classification, Requirement of an ideal antiseptic and disinfectant	4	10
6	Drugs used in endocrine disorders - Pituitary gland – Growth hormone, Somatostatin,	4	10

	Antidiuretic hormone, Thyroid - Thyroid Hormone, Anti- Thyroid drugs, Parathormone, Calcitonin, Pancreas – Insulin, Glucagons, Diazoxide, oral Anti- Diabetic Agents, Adrenal cortex steroids –ACTH, Hormones of Adrenal cortex, Male & Female sex hormones, Steroids in ophthalmic disorders- mode of administration, adverse reactions, Therapeutic uses		
7	Vitamins - Vitamin A, Vitamin D, Vitamin E, Vitamin K, Vitamin B1, Vitamin B2, B5, B6, B12& Vitamin C- Sources, Absorption, Fate and Excretion, Adverse reactions, Therapeutic uses	2	5
8	Topical Medication in Ophthalmology - Factors for Preparing of an ophthalmic solution, Precaution, Advantages of a solution, Disadvantages of a solution, Ophthalmic Ointment –Advantage & Disadvantages, Routs of Drug administration in ophthalmic conditions	2	10
9	Sympathetic and Parasympathetic Drugs (Mitotic, Mydriatic and Cycloplegic) - Physiology, Neurohumoral transmitters, Action on eye, Nor adrenaline and dopamine, Action on eye Miotics –Types, Direct acting and indirect acting Miotics,Drugs- mechanism of action, adverse reaction, Therapeutic uses, Preparation Cycloplegics - Drugs- mechanism of action, Therapeutic uses, Preparation Mydriatic – Classification, Drugs- mechanism of action, adverse reaction, Therapeutic uses, Preparation, combination of Mydriatic agents, general indications for use of Mydriatic agents, Contraindications, Drugs used in the treatment of Glaucoma – Local, Systemic	2	15
10	Drugs in relation to Aqueous Humour - The aqueous humour & IOP, Ocular Hypotensives – Local, Systemic Drugs- Mechanism of action, Absorption, Fate and Excretion, Adverse reactions, Preparation & Dosage, Therapeutic uses.	2	10
11	Drug –Toxicity in relation to ocular Functions - General considerations, Pre-treatment examination, Repeat eye examinations, Ocular manifestation of Drug toxicit	2	10
	Total	**30 hrs**	**100**

Sem II

Chemistry

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	Structure of an atom - planetary structure of the atom, energy levels, valency Chemical bonding and molecular shape	7	20
2	States of matter – matter, intermolecular force and distance. Characteristics: Solid: allotropy, sublimation Liquid: viscosity, surface tension Gases: kinetic theory of gases, critical temperatures, pressure and volume.	5	16
3	Acids and Bases – properties and equivalent bases, neutralization, normality, molarity, pH, buffer solutions	7	20
4	Ionic equilibrium – Ionisation, equilibrium in aqueous solutions, solubility product, common ion effect	2	8
5	Adsorption and colloids	4	16
6	Classification of organic compounds Empirical, molecular and structural formulae Study of the functional groups Quaternary ammonium salts	5	20
	Total	**30 hrs**	**100**

Sem II

Computer Skills

No.	Topics and details	No. of lectures assigned	Weightage in %
1	**Computer Fundamentals** 1. Introduction to Computer 2. Areas of application of Computer 3. Classification of Computer 4. Hardware Configuration of Computer 5. Working of Computer 6. Types of software	10	15
2	**Operating System** 1. Basics of DOS Operating System 2. Basics of Windows Operating System	10	15
3	**Microsoft Word** 1. Introduction 2. Format Paragraph and Font 3. Working with Indents and Tab 4. Inserting and Formatting ClipArt, Pictures, Auto shapes and WordArt 5. Bullets and Numbering 6. Tables and Borders	10	20
4	**Microsoft Excel** 1. Introduction 2. How to enter data in worksheet and formatting worksheet 3. Working with Basic Formulas 4. Data Sorting, Subtotal and Filtering 5. Working with Charts	10	20
5	**Microsoft PowerPoint** 1. Introduction 2. Working with Slide Layouts and adding data 3. Applying Custom Animation and Slide Transition 4. Applying Slide Designs 5. Adding Sounds and Movies 6. Using Rehearse Timing and Record Narration 7. Working with Master Slides	10	20

6	**Photoshop** 1. Introduction 2. Selection Techniques 3. Working with Layers 4. Learning Image Enhancement for presentations	10	10
	Total	**60 hrs**	**100**

Sem II

Personality Development

No.	Topics and details	No. of lectures assigned	Weightage in %
1	What is personality? ➢ Traits ➢ Characteristics of a well developed personality. ➢ How to develop a Good Personality.	4	10
2	Communication – verbal, non – verbal. ➢ Art of Listening ➢ Speaking (clarity of speech, appropriate word choice) ➢ Body language	4	15
3	Public Speaking ➢ Debate ➢ Speech ➢ Group discussion ➢ Art of conversation	2	10
4	Voice Cultivation	2	5
5	Social etiquette – ➢ Introduction ➢ Meeting people ➢ Public place behaviour	2	5
6	Elements of human relations	2	10
7	Mind set	2	5
8	Positive thinking and confidence building	2	10
9	Goal Setting	2	5
10	Current topics	2	5
11	Time, stress and anger management	2	5
12	Personal hygiene and presentation	2	10
13	Preparing for job interviews	2	5
	Total	**30 hrs**	**100**

Sem II

Clinical Practice

Hrs: 6/wk
Credit: 3

Guidelines

No.	Skills	Duration	Remarks
1	• OPD set up • Refraction room • Ward set up • Equipments • Ophthalmic Drugs • Retinoscopy	1st month	To observe
2	History taking	2nd month	1 /day
3	Torch light examination of eyes	3rd month	5/day
4	Vision taking	4th month	10/day

- All procedures mentioned above are to be performed after prior permission and under strict supervision of an optometrist or an ophthalmologist.
- Work done in the hospitals must be noted in the logbook each day and duly signed by the optometrist or doctor in charge.
- At the end of every month, the teacher in charge will sign the log book

Sem III

Optometry

Theory

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	Ophthalmic Lenses ➢ Optical Centration and Prismatic affect – Prism Decentration. ➢ Cent ration and Decent ration of Lenses. ➢ Decentration for near work and exercises based on equation.	10	20
2	Vertex Power and Effectively ➢ Front Vertex Power and Back Vertex power ➢ Back Vertex Distance and Effectively. ➢ Exercises based on Equation	6	9
3	Ophthalmic Lenses ➢ Verification of Lenses ➢ Geneva lens measure. ➢ Lensometer.	4	2
4	Multifocal Spectacle Lenses ➢ Trifocals. ➢ Lenticular lens	2	4
5	Bifocals ➢ Various types of bifocals ➢ Manufacturing of fused/solid bifocals ➢ Optical centration for near ➢ Dimensions of shaped/round bifocals ➢ Vertical prism balancing in bifocals for near	10	20
6	Progressive addition lenses ➢ Definition ➢ Types ➢ Designs ➢ Merits, demerits ➢ Power finding ➢ Markings ➢ Dispensing ➢ Trouble shooting	12	20
7	Power finding of lenses ➢ Neutralization with trial box lenses. ➢ Lensometer. ➢ Geneva Lens Measure.	2	5

8	**Low Vision** ➢ Basic Definitions. ➢ LVA Clinic (Set Up and Requirements) ➢ Preliminary Examination and Rehabilitation. ➢ Visual Re - education and Rehabilitation. Optical aids available.	14	20
	Total	**60 hrs**	**100**

Sem III

Optometry

Practical

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Use of Geneva Lens Measure - Power finding of Spherical lenses, toric lenses and Solid bifocal lenses	9	5
2	Use of Focimeter, Mechanism and Working – Neutralization of Cylindrical and spherical lenses, Toric lenses, bifocal lenses, Varifocal lenses	24	20
3	Optical Center Marking in Spherical lenses	3	5
4	Optical center marking and cylindrical axis setting in toric lenses and bifocal lenses	3	5
5	Neutralization of prism	3	5
6	Documentation of Lenses - Ordering of lense	3	5
7	Neutralization of Prisms (base- apex line)	3	5
8	Measurement of dimensions of spectacle lenses and frames	6	5
9	PD measurement and center of pupil marking	3	5
10	Duplication of a pair of spectacles	3	5
11	Neutralization of broken lenses	3	5
12	Markings in bifocals and Varifocals	6	5
13	Retinoscopy with streak retinoscope	18	20
14	Use of Maddox Wing and Maddox Rod.	3	5
	Total	**90 hrs**	**100**

Sem III

Clinical Ophthalmology (I)

No.	Topics and details	No. of Lectures assigned	Weightage in %
1	History Taking – General, Ophthalmic	6	10
2	Preliminary Eye Examination - Torch light examination, tonometry, sac syringing, ophthalmoscopy, slit lamp examination	6	16
3	Eyelids -Blepharospasm, Ectropion, Entropion, trichiasis and symblephron, eyelid tumors, ptosis, eyelid Retraction, eye lid Trauma, xanthelasma,	6	12
4	Lacrimal System - Dry eye, watering eye, lacrimal obstruction, lacrimal sac tumours, lacrimal trauma	5	12
5	Sclera, Episclera - Ecstasia and Staphyloma, Scleritis and Episcleritis	5	10
6	Conjunctiva and Cornea -Inflammation. Keratoconjuctivitis sicca, Vitamin A Deficiency, Papillae, Follicles, SPK, Conjunctivitis (bacterial, viral, fungal, Allergic), spring catarrh, Xerosis, Bitot's spot, Corneal Opacities. Giant Papillary Conjunctivitis, keratitis, Herpes zoster opthalmicus, Corneal Dystrophy, corneal ulcers	6	15
7	Iris, Ciliary body, Choroid & Pupil -Primary and secondary disease of the iris and Ciliary body, inflammation, irtis, parsplanitis, Disease of the Choroid and Tumours.	6	15
8	Orbit - Orbital tumours, Orbital Inflammation, Orbital Trauma	5	10
	Total	**45 hrs**	**100**

Sem III

Contact Lens

No.	Topics and details	No. of lectures assigned	Weightage in %
1	History of Contact Lens	1	2
2	Identification of Contact Lens	1	5
3	RGP Contact lens Material	1	5
4	RGP Contact Lens Manufacturing Processes.	1	3
5	Optics of Contact Lenses	2	5
6	Optical Principles of Contact Lenses	1	2
7	RGP Contact Lens Designs	1	3
8	RGP Spherical and Toric Lens Design	1	5
9	Preliminary Eye Examination/Test to be performed before Trial of RGP	1	5
10	Indications and Contraindications	1	4
11	Keratometry	1	5
12	Fitting Techniques of RGP'S	1	10
13	Trial Lens Selection	1	2
14	Insertion/Removal	1	3
15	Assessment of Fit	2	10
16	Ordering of final lens	1	3
17	RGP Contact Lens Verification	2	5
18	Dispensing of the Lens	1	4
19	Do's and Don'ts	1	5
20	Contact lens for keratoconus	2	5

21	Special cases	6	9
22	**Practical** Keratometry and parameter selection	4	-
23	Insertion and removal of RGP lens	6	-
24	Fit evaluation (slit lamp technique	8	-
25	Over refraction	6	-
26	Final lens ordering	6	-
	Total	**45 hrs**	**100**

Sem III

Orthoptic

No.	Topics and details	No. of lectures assigned	Weightage in %
1	**Binocular Vision** Spatial Sense	2	50
2	Evolution of Binocular Vision	1	
3	Binocular Fusion, suppression, Rivalry and summation	2	
4	Visual direction, Local sign and corresponding points	1	
5	Visual Distance, Empirical cues	1	
6	Panum's Space	1	
7	Stereopsis	1	
8	Developmental binocular vision	1	
9	Longitudinal horopter	1	
10	Neural aspects of binocular vision	1	
11	Visually guided behaviors and anisekonia	1	
12	ARC	1	
13	Differential Intensity (Webner's and fetcher's Law)	1	
14	Visual Acuity in relation to intensity and Contrast	1	
15	**Orthoptic** Qualitative and quantitative diagnosis of strabismus	3	50
16	Esodeviatios	1	
17	Exodeviatios	1	
18	A-V Phenomenon	1	
19	Cyclovertical Squint	1	
20	Pseudostrabismus	1	
21	Amblyopia and eccentric fixation	1	
22	Treatment of Amblyopia	1	
23	Special forms of strabismus	1	
24	Nystagmus	1	
25	Non surgical management of strabismus	1	
26	Review of Orthoptic procedures	1	
	Total	**30 hrs**	**100**

Sem III

Ocular Pathology

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Disease at the cellular level - Cause of cellular adaptation, injury and cell death, Intra cellular accumulation, calcification	2	10
2	Inflammation and repair - Types of inflammation, Morphology, clinical manifestation, Repair – parenchymal Regeneration, repair by connective tissue reparative response (systemic & local)	2	10
3	Fluid and heamodynamic derangements - Oedema, Hyperemia or congestion, haemorrhage, Thrombosis, Embolism, Infarction. Shock	2	10
4	immune Disorders of immunity -Components of the immune system, Mechanism of the system, classification, transplant rejection, autoimmune disease, Immunodeficiency disease, Amyloidosis.	2	10
5	Haematopoietic and lymphoid system -Red cell disorders, nutritional anaemia, Bone marrow suppression, Polycythaemia Vera or Erythraemia, White cells Disorders, haemorrhagic diatheses, Thrombocytopenia, Coagulation Disorders.	2	5
6	Cardio vascular system -Congestive Cardiac failure, Ischemic or Coronary heart disease, Hypertensive heart disease. Pericardial disease, myocardial disease, endocardial disease, vascular disorders, venous disorders, Lymphatic disorders, tumours,	4	5
7	Nervous system -Neurons and Glia, Correlation between function and location, Encasement of the brain by the skull, Trauma to the CNS & spinal cord, Vascular, toxic, Nutritional and metabolic disorders of the CNS, Brain Tumours, Infections. Degenerative disease of the CNS Demyelinating diseases, Peripheral Neuropathy	4	10
8	Musculo skeletal system -Bones,Joints, Muscles	2	5

9	Respiratory system –Pulmonary embolism, infarction Oedema & Haemorrhage, COPD, Pulmonary infections.	2	5
10	Nutritional disorders -Protein-calorie malnutrition, Vitamin deficiencies,	2	5
11	Gastro-intestinal tract and parasitology -Oral cavity, stomach, small intestine, Liver, Cestodes or tapeworm	2	5
12	Endocrine system -Anterior pituitary (Adenohypophysis), Posterior pituitary (Neurohypophysis), Thyroid, Parathyroid Glands, Adrenal cortex, Diabetes mellitus	2	10
13	Neoplasia- Non – neoplastic cell Growth, Neoplasia, Differentiation and Aplasia, Spread of Tumours, Invasion and metastasis, grading and staging of cancer	2	10
	Total	**30 hrs**	**100**

Sem III

Ocular Microbiology

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Introduction – history of microbiology, types of cells (animal cell, plant cell/eukaryotic cells/ prokaryotic cells)	2	10
2	Disease at the cellular level - Cause of cellular adaptation, injury and cell death, Intra cellular accumulation, calcification Bacteria Virus Fungi Protozoa	8	15
3	Classification of Microbes. G + ve and G – ve Cocci and Bacilli, and their examples causing ocular infection. Spore bearing Bacilli and their examples ocular infection Spirochete causing ocular infection Chlamydia, causing ocular infection Virus and Fungi. Examples, which causes ocular infections	8	25
4	Staining Procedure and Fixation of Tissues Preparation of a bacterial smear, staining procedures- simple staining, Grams staining, Acid fast staining, Metachromatic granules staining	3	15
5	Sterilization - Definition, Methods of sterilization Heat – Autoclaving, Hot Air oven, Incineration Radiation, Filtrations, Disinfectants.	5	25
6	Microscopy - Study of a microscope Light Microscopy, Parts of a light microscope, Path of light in a light microscope, Resolving power, Use of alight microscope, Different types of microscopy, - Dark field microscopy, Phase contrast,	4	10

	fluorescent microscopy and Electron microscopy		
	Total	**30 hrs**	**100**

Sem III

Entrepreneurship

No	Topics and details	No of lectures assigned	Weightage in %
1	Concept of entrepreneurship – need, qualities of an entrepreneur (entrepreneurial attitude – failure and success), advantages of entrepreneurship, SWOT analysis.	2	50 Term work
2	Developing specific skills – creativity, decision making, team building, stress management	3	
3	Factors of production – productivity, factors of production (fixed, variable), total cost of production, exercise of costing.	4	
4	Finance management – sources of finance, book keeping components, financial institutions	8	
5	Special assistance for women entrepreneurs.	1	
6	Industry visit	6	
7	Project presentation	6	50
	Total	**30 hrs**	**100**

Sem III
Clinical Practice

Hours: 6 hrs/wk
Credit: 3

Guidelines

No.	Skills	Duration	Remarks
1	Retinoscopy (dilated /undilated)	1st month	2/day
2	Subjective verification of refraction	2nd month	2/day
3	• Lensometry • Neutralization of lenses	3rd month	2/day 5/day
4	• A-scan • Perimetry • Slit-lamp examination • Opthalmoscopy • Dispensing Contact lens • Lasers	4th month	Observing under supervision
	Surgical procedures		

- All procedures mentioned above are to be performed after prior permission and under strict supervision of an optometrist or an ophthalmologist.
- Work done in the hospitals must be noted in the logbook each day and duly signed by the optometrist or doctor in charge.
- At the end of every month, to be signed by the teacher in charge.

Sem IV

Optometry

Theory

No.	Topics and Details	No. of lectures assigned	Weightage in %
1	Theory of Lens Glazing	4	5
2	Theory of Lens Surfacing	4	5
3	Protective Lens	2	5
4	Visible Spectrum	2	2
5	Harmful effects of radiation	2	5
6	Reflectance.	2	5
7	Anti-Reflection Coating	2	5
8	Transmittance.	2	5
9	Photochromatic Lens.	2	5
10	Hi-Index Lens.	2	5
11	Tinted Lens	4	5
12	Manufacturing of Tinted Lenses	2	5
13	Types of Tinted Lenses	2	5
14	Absorption.	2	5
15	Industrial Eye Protectors.	2	5
16	Special Lenses for Sports	2	5
17	**Dispensing Optics** Definition of Dispensing. Lens selection. Frame Selection. Measurements. Ordering. Fitting. Verification. Dispensing/Educating the	8	8

	Patients		
	Ophthalmic instrumentation Keratomeetr. Visual Field Charting Equipments. Refractometer.	14	15
	Total	**60 hrs**	**100**

Sem IV

Optometry Workshop

No.	Topics and Details	No. of Lectures assigned	Weightage in %
1	Introduction and Study of various tools, Machines, Abrasives, Accessories used in Lens Surfacing and Lens Glazing.	10	20
2	Cutting and Fitting of Lenses in Frames viz. Plastic Frames Metal Frames Rimless Frames Supra Nylon Frames	30	30
3	SHAPES Round Square Ray ban Others	12	10
4	Practical Grinding for Surfacing of Spherical lenses. Surfacing of Cylindrical lenses. Surfacing of Sphero- Cylindrical lens Bifocals.	30	30
5	Keratometry.	6	5
6	Visits to the lens manufacturing factory	12	5
	Total	**90 hrs**	**100**

Sem IV

Clinical Ophthalmology (II)

No	Topics and details	No. of lectures assigned	Weightage in %
1	Lens- Congenital defect, developmental defects, cataract, subluxation of lens, Dislocation of lens, Aphakia, Pseudophakia, after cataract – PCO.	10	20
2	Glaucoma -An overview of Glaucoma, Aqueous humour Dynamics, intra ocular pressure, Evaluation of the optic nerve head, Visual fields, Glaucoma screening, Classification of Glaucoma, Primary open angle glaucoma, Primary angle closure glaucoma, secondary glaucoma, principles of medical therapy, other modalities of glaucoma treatment.	10	20
3	Vitreous -Developmental abnormalities, Juvenile retinoschisis, vitreous hemorrhage, inflammation & vitreous, floaters, synchisis syntilans, fluid vitreous	4	8
4	Retina - retinitis pigmentosa, retinal detachment, peripheral retinal degeneration retinal holes, retinoblastoma,diabetic retinopathy hypertensive retinopathy, macular disorders, intra ocular foreign body,	5	10
5	Neuro-opthalmology – optic neuritis, papilloedema, rotrobulbar neuritis Emergencies in Ophthalmology – CRAO, Acute congestive glaucoma, trauma - role of ophthalmic assistant in emergencies	5	15
6	Malingering, Hysteria	2	4
7	Eye Bank.	2	2
8	Anesthesia in Ophthalmology	2	6

9	Various Procedures in Ophthalmology -Slit Lamp examination, Fluorescein staining, Ultrasonography, Photocoagulation, Cryopexy, X- Ray, Ophthalmoscopy, other OPD and OT procedures.	5	15
	Total	**45 hrs**	**100**

Sem IV

Contact Lens

No.	Topics and details	No. of lectures assigned	Weightage in %
1	Soft Contact Lens Materials.	1	5
2	Soft Contact Lens Manufacturing.	2	3
3	Identification Of Soft Contact Lenses Low water content Medium water content High water content	1	5
4	Fitting procedures	2	2
5	Indications / Contra Indications	1	1
6	Assessment of Fit of Soft Lenses.	2	2
7	Over Refraction / Ordering from Market	2	4
8	Soft lens Verification before Dispensing.	1	5
9	Wearing – Insertion / Removal – handling instructions Do's and Don'ts – handling instructions	2	5
10	Various Soft Contact Lenses, solutions available in the Market.	2	12
11	Care, Cleaning and maintenance of Lenses	2	5
12	Complications of Soft Contact Lenses. Ocular Responses to Contact Lenses and Solutions	4	12
13	Toric soft contact lenses	2	5
14	Contact lenses for Presbyopia	2	5
15	Silicone hydrogels	2	2

16	Cosmetic, prosthetic and therapeutic contact lenses.	2	2
	Practical ➢ Overview of RGP fitting ➢ Insertion and removal of SCL ➢ Fit evaluation ➢ Over refraction ➢ Final lens ordering ➢ Toric SCL fitting ➢ Bifocal and multifocal SCL fitting	30	25
	Total	**45 hrs**	**100**

Sem IV

Research and survey

No	Topics and details	No. of lectures assigned	Weightage in %
1	Introduction to research methodology, research fundamentals, terminologies used in research.	3	15
2	Types of Research - An Introduction to Research, Meaning of Research, Criteria of Good Research, Qualities of a Researcher, Significance of Research, Research Techniques	5	10
3	Research Process - Formulating the Research problem, Extensive Literature Survey, Preparing a Research Design, Determining Sample Design, Collection of Data, and Execution of the Project, Analysis of Data, Generalizations & interpretation, Preparation of the Report.	5	10
4	Nature of Descriptive Research Introduction, Learning objectives, Survey Studies, Interrelationship Studies, Developmental Studies, Evaluation	3	5
5	Qualitative Research Methods – Descriptive Research, Purpose, Tools of Descriptive Research, Surveys, Questionnaire, Interview, Observation, Types of Data	5	5
6	Sampling and sampling distribution introduction, techniques, sampling process .Requisites of Good Sampling method, Advantages of sampling, Types of Sampling Methods, Sampling Error	5	10
7	Rating Scales - Definition and Meaning of Rating Scales, Advantages of Rating Scales, Limitations of Rating Scales, Types of Rating Scales, Attitude and measurement scales.	5	10
8	Data Analysis - Measures of Central Tendency, Measures of Dispersion,	4	10
9	Research Project and presentation.	10	25
	Total	**45 hrs**	**100**

Sem IV

Clinical Practice

Hrs: 6
Credit: 3

Guidelines

No.	Skills	Duration	Remarks
1	Subjective verification of refraction	1st month	4/day
2	• Sac Syringing • IOP Measurement	2nd month	1/day 5/day
3	• Auto refractometer • Perimeter • Keratometer • A Scan biometer • Slit lamp • Ophthalmoscope	3rd month	Operating equipments under supervision
4	Surgical procedure & Fitting of contact lenses	4th month	Assisting under strict supervision

- All procedures mentioned above are to be performed after prior permission and under strict supervision of an optometrist or an ophthalmologist.
- Work done in the hospitals must be noted in the logbook each day and duly signed by the optometrist or doctor in charge.
- At the end of every month, to be signed by the teacher in charge.

INTERNSHIP

SEM V & SEM VI

Students attend the assigned hospital for 7- 8 hours a day and perform various tasks in the Ophthalmology outpatient department and in the operation theatre. They work under the guidance of Ophthalmologists and Optometrists. Besides the hospital work, students also get practical experience in the following areas:

1. Orthoptic clinic at Bombay Hospital
2. Low Vision clinic at National Association for Blind, Worli.
3. Eye Camps
4. School Clinics
5. Surgical Assistance
6. Project/Research work

Guidelines for Interns

No.	Procedures	Nos.	Remarks
1	History taking	1/day	Detailed ophthalmic history
2	Refraction	5/day	With guidance
3	Dilated Retinoscopy	5/day	With guidance
4	Post Mydriatic test	5/day	Hypermetropia, Myopia, Astigmatism, Anisometropia, Aphakia
5	Tonometry	10/day	Under guidance
6	Perimetry	2/day	All types of visual field defects
7	Sac syringing	2/day	Treatment prescribed. Follow up.
8	Surgical Assistance Observation	1/day	Observing cataract, DCR, chalazion, retinal detachment, squint & others surgeries.
9	Eye dressings in ward/OPD	1/day	Under guidance
10	Contact lens fitting	1/day	Under guidance
11	Orthoptic exercise training	1/day	Under guidance
12	Low Vision Aid prescription	1/day	Under guidance
13	Eye camps	1/month	School clinics & rural areas

- All procedures mentioned above are to be performed after prior permission and under strict supervision of an optometrist or an ophthalmologist.
- Work done in the hospitals must be noted in the logbook each day and duly signed by the optometrist or doctor in charge.
- At the end of every month, to be signed by the teacher in charge.

GUIDELINES FOR TRAINING IN OPTICAL OUTLET

1. Dispensing Optics

- Knowledge on various brands of spectacle lenses/frames/accessories.
- Idea about the cost of lenses and frames.
- Placing order for lenses and frames.
- Tinted lenses/ filters/ protective lenses.
- Axis marking in toric lenses.
- Frame adjustments (facial wrap, alignment, pantoscopic tilt).

2. Contact Lens

- Brands of contact lenses.
- Fitting procedures.
- Final dispensing and aftercare.

Visual Optics
Semester VI
University Exam Syllabus

Sr. No.	Topics	Marks	Time
Q.1	Viva • All Refractive Errors • Retinoscopy • RAF Gauge • Binocular single vision • Accommodation & Convergence - definition / defect • Amblyopia (detail) / Occlusion therapy. • Maddox rod • Maddox wing • Pin hole • Jackson Cross Cylinder • Green & Red filter • Ishihara chart • Prisms 4D • Convex / Concave / Cylindrical lenses • Hess screen • Bjerumms screen • RGP / Soft contact lens • Synaptophore slides • Visual field charts • Aphakic spectacles • Plain Retinoscope • Ophthalmic Drugs	50	10 min each student
Q. 2	Project work presentation & Viva	50	10 min each student
	Total	**100**	**20 min each student**

Note: All topics in the subject of Visual Optics which may not be mentioned above, but covered in theory and during hospital visits and internship, are included in the syllabus.

Clinical Ophthalmology
Semester VI
University Exam Syllabus

Sr. No.	Topics	Marks	Time
Q1.	**Cases** • Cataract – Immature, Mature • Pseudophakia/ Intraocular Lens • Aphakia • Corneal opacity • Pterygium • Squint • Pinguecula • Chalazion • Red eye/Conjunctivitis • Ptosis • Irregular pupil – Synechiae	50 marks	10 mins per student
Q2.	**Table Viva** • Anaesthesia • Slit lamp • A/B Scan • Laser • X-ray/ Ophthalmoscopy • All Surgical instruments - • Cataract/ DCR/ Chalazion/ Squint • Drugs – Lignocaine/Xylocaine/ • Mydriatics/ Miotics/Antibiotics etc. • Ophthalmoscope • Ishihara Colour Vision Charts • Perimetry Reports • Tonometer/IOP • Fluorescein strip/dye • X-ray – Orbit /Intraocular foreign body • 3 Mirror lens	50 marks	10 mins per student
	Total	**100 marks**	**20 mins per student**

Note: All topics in the subject of Clinical Ophthalmology which may not be mentioned above, but covered in theory and during hospital visits and internship, are included in the syllabus.

Optometry Practical
Semester VI
University Exam Syllabus

Total marks 100

Sr. No.	Topic	Time	Marks
Q. 1	Retinoscopy on ' Keelers' Practice Eye	7 Minutes / students	25
Q. 2	Lensometer • Power Finding (Bifocals/ Verifocals) • Cylindrical Axis Setting and Marking	7 Minutes / students	15 05
Q. 3	Geneva Lens Measure Power finding (Single vision and Solid bifocals)	7 Minutes / students	10
Q.4	Spots (Topic) • Trial box • Grinding and edging material • Contact lenses • Spectacle lenses / frames • Low vision aids	7 Minutes / students	20
Q. 5	VIVA	7 Minutes / students	25
	Total		**100**

Note: At a time five students are assessed in the optometry lab; they are timed and shifted from one question to another

Number of examiners: 2
Number of technical assistant: 1
Number of lab attendant: 1