



Dr. D.Y. Patil Institute of Optometry and Visual Sciences

Syllabi & regulations for Bachelor of Clinical Optometry
2018 - 19

Syllabus for B. Optometry

FIRST YEAR - FIRST SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C101	General Anatomy	Department of Anatomy	25	10
C102	General Physiology	Department of Physiology	35	15
C103	Physical Optics	College of Engineering	35	15
C104	Geometrical Optics	Optometry Faculty	50	15
C105	Dispensing Optics-I	Optometry Faculty	30	70
C106	Computers for Optometry	Optometry Faculty	25	25
	Total Hours		200	150

FIRST YEAR - SECOND SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C201	Ocular Anatomy	Department of Ophthalmology	20	10
C202	Ocular Physiology	Department of Physiology	45	15
C203	Basic Biochemistry	Department Of Biochemistry	50	20
C204	Basic Pharmacology	Department of Pharmacology	30	10
C205	Basic Pathology	Department of Pathology	15	15
C206	Basic Microbiology	Department of Microbiology	20	15
C207	Ophthalmic Optics	Optometry Faculty	40	15
	Total hours		220	100

'C' Course

1st digit indicates Semester

Next two digits indicates course number

Syllabus for B. Optometry

SECOND YEAR - THIRD SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C301	Dispensing Optics - II	Optometry Faculty	50	30
C302	Visual Optics - I	Optometry Faculty	50	90
C303	Optometric Instruments	Optometry Faculty	50	30
C304	Clinical Examination of Eye	Optometry Faculty	50	30
C305	Ocular Diseases-I	Department of Ophthalmology	30	20
Total Hours			230	200

SECOND YEAR - FOURTH SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C401	Optometric Optics (I)	Optometric Faculty	50	25
C402	Visual Optics (II)	Optometric Faculty	50	45
C403	Low vision Aids	Optometric Faculty	10	10
C404	Ocular diseases (II)	Department of Ophthalmology	50	35
C405	Optometric Investigations	Optometric Faculty	50	60
C406	Hospital procedures & Medical Psychology	Department of Hospital Administration.	20	25
Total hours			230	200

'C' indicates Course
1st digit indicates Semester
Next two digits indicates course number

Syllabus for B. Optometry

THIRD YEAR - FIFTH SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C501	Orthoptics and Binocular Vision	Optometry Faculty	75	75
C502	Major Eye Diseases	Optometry Faculty	75	75
C503	Systemic Diseases	Optometry Faculty	30	30
C504	Contact Lenses-I	Optometry Faculty	25	25
C505	Public Health & Community Optometry	PSM Department	45	30
C506	Research Methodology & Biostatistics	Community Department	30	nil
	Total Hours		250	250

THIRD YEAR - SIXTH SEMESTER

Topic Code	Subject	Lectures	Number of hours/marks	
			Theory	Practical
C601	Pediatric Optometry	Optometry Faculty	50	50
C602	Occupational Optometry	Optometry Faculty	25	20
C603	Geriatric Optometry	Optometry Faculty	25	10
C604	Advanced Orthoptics	Optometry Faculty	25	10
C605	Contact Lenses- II	Optometry Faculty	25	10
C606	Medical Law & Ethics	FMT department	15	Nil
C607	Medical Psychology	Department of Psychology	10	Nil
	Total Hours		185	100

Fourth Year (Internship) : In speciality clinics in eye O.P.D. and Optical Lab. and visit to various Optical establishments

SYLLABUS FOR B. Optometry

C101 General Anatomy

- 1) **Scope and Objective:** The Optometry students should learn the basic structure of human body including skeletons, Muscular structure of organs liver, kidney, stomach, pancreas, various glands.

This course gives the knowledge of construction and structure of human body.

2) **Text and Reference Books:**

- a) Principles of Human Anatomy- Tortora, Derickson
- b) Human Anatomy – Chaurasia
- c) Human Anatomy & Physiology – Ross & Willson
- d) Essentials of Neuro Anatomy – Datta
- e) Human Anatomy & Physiology for Nursing

3) **Lecture Topic:**

- 1. Introduction to bones, classification of types of bone with examples. Planes of the body
- 2. Demonstration of parts of Respiratory system- Lungs, trachea, larynx, nose
- 3. Demonstration of parts of Digestive system- stomach, intestines, liver, pancreas
- 4. Demonstration of parts of Urinary system- Kidney, Ureter, Urinary Bladder
- 5. Demonstration of parts of Nervous System, Brain, Spinal Cord
- 6. Demonstration of parts of Male and Female reproductive system
- 7. Embryology models- mitosis, meiosis, general embryology, placenta
- 8. Histology- General histology- cell, epithelium, cartilage, bone, muscle, lymphoid tissue, blood vessels
- 9. Histology- Glands- Salivary, Thyroid, Pituitary, Adrenals, skin
- 10. Demonstration of parts of cardiovascular system, Heart, major blood vessels

C102 General Physiology

- 1) **Scope and Objective:** This course gives information about functioning of human body, CNS & ANS, somatic nervous system, cranial nerves, practical demonstration on Hematology, determination of blood groups, clinical examination of cardio-vascular system, respiratory system.
- 2) **Text and Reference Books:**
 - a. Human Anatomy & Physiology – Ross & Willson
 - b. Essentials of Physiology – Datta
 - c. Human Anatomy & Physiology for Nursing
- 3) **Lecture Topic:**
 1. Generalizations about body structure terms used in describing body structure. Definition and terminology in human biology
 2. Classifications of body system and tissues
 3. Generalizations about body functions. Homeostasis
 4. Cell Physiology – movement of substances through cell membranes, types of processes, Diffusion, osmosis, filtration, physiological pumps, phagocytosis and pinocytosis
 5. Neuromuscular transmission- mechanism of muscle contraction. Differences in three types of muscles
 6. Nervous System- cells and nerve impulse conduction, definitions and various mechanisms
 7. Somatic nervous system- divisions of nervous system, brain and spinal cord divisions and size and parts of brain, brain stem structure, functions, sleep, consciousness, memory
 8. Cranial nerves-structure and functions
 9. Somatic sensory and motor pathways – Reflexes – Definition and some somatic reflexes of clinical importance
 10. Automatic nervous system- definitions, structure system- general principles of functions
 11. A.N.S. as a whole – sympathetic and parasympathetic divisions, functions
 12. Sense Organs- classification, structure and functions and types of pain
 13. Eye, Auditory apparatus, olfactory sense organs, restatory sense organs
 14. Endocrine System- meaning prostaglandin (tissue hormones) how hormones act
 15. Blood – Volume, component cells- structure and functions formation and life span, blood groups, plasma and coagulation purpose, mechanism, factors affecting blood clotting
 16. Heart- locations, size, structure, functions, conduction system
 17. E C G, Control of heart rate, cardiac cycle
 18. Blood circulation- definitions, control of arterial blood pressure
 19. Lymphatic system- definition formation, distribution, structure and functions
 20. Physiology of Respiration- Pulmonary ventilation, volumes of air exchange and types of breathing, external and internal respiration, exchange of gases for cornea even under closed eye conditions
 21. Definition of digestion- purpose mechanical and chemical digestion, absorption, definition and how accomplished
 22. Homeostatis of body temperature heat production and loss, heat dissipating and gaining mechanism control of body temperature

23. Urinary system- Kidneys size, shape, location, outline of structure, functions influence on blood pressure
24. Urinary System- Ureters, bladder, urethra, outline of structure, location and functions
25. Fluid and Electrolyte balance
General principles about fluid balance mechanism that maintain homeostasis of fluid and electrolyte balance in human crystalline lens and cornea caused of opacities (Cataract)
26. Reproduction of cells-
Deoxyribonucleic acid, mitosis, meiosis, spermatogenesis, genesis
27. Male reproductive system- General outline of structure involves
28. Female reproductive system- general outline of main and accessory structures I involved
29. Recurring cycles ovulation- menstruation, regulations, and clinical significance effect on cornea, pregnancy and birth breast- family planning.
30. Sexual reproduction- meiosis, Genes, Chromosomes, inheritance and human variations
31. General functions of normal human body, age related changes
32. Immune System- Major components –Lymphocytes, antibodies (immunoglobulins) complement, properdin, interferon, conditions, involving abnormalities of immune system. Transplant rejection- corneal transplant Major diseases- Cancer AIDS
33. Stress – definitions development concept mechanisms, stress and disease
34. Stress syndrome, indications of stress psychological stress

Physiology (Practicals)

A. Hematology (Practicals)

- 1 The microscope and collection of blood
- 2 Estimation of hemoglobin content of blood
- 3 W.B.C Count
- 4 R.B.C Count
- 5 Determination of blood groups
- 6 Differential W.B.C. Count
7. Determination of bleeding time and coagulation

B Clinical Physiology (Lecture cum demonstrations)

- 1 Introduction to clinical examination
- 2 Clinical examinations of Arterial pulse and Estiman of various pressures
3. Determination of arterial blood pressure
- 4 Clinical examination of cardiovascular system
- 5 Clinical Examination of Respiratory system
- 6 Clinical examination of Alimentary system of abdomen
7. Clinical examination of higher functions

C103 Physical Optics and Principles of Lightning

1) **Scope and Objective:** The Optometric students should learn the basic computation and behaviour of light, without which eye's can see anything. Importance of Artificial Light sources increases the relevance of light today and measures of wave theory of light and wave aspects like interference, diffraction, polarization, various optical instruments used to study theory and experiments will be presented.

2) **Text and Reference Books:**

- a) Geometrical, Physical and Visual Optics- Micheale Keating Butterworth Heinemann
- b) A Textbook of Optics N. Subramaniam and Brij Lal
- c) Fundamental of Optics: F. A Jenkins and H. E. White

Lecture Topics for Physical Optics

1) **Nature of Light:**

- a) Wave nature of light- short comings of wave theory
- b) Quantum theory- dual nature of light
- c) Mathematical representation of wave- S.H.M. Energy composition of S.H.M in straight line and at right angles
- d) Huygen's Principle- Laws of reflection and refraction at spherical surfaces and lenses
- e) The Axial and paraxial rays
- f) Wave velocity

2) **Interference:**

- a) Description of the phenomena- Young's experiments, coherent sources, phase and difference and intensity. Theory of interference fringes
- b) Interference in thin films- wedge shaped films- testing of plainness of surface
- c) Colors of thin films- wedge shaped thin films- testing of plainness of surface
- d) Newton's rings experiment- refractive index or liquid
- e) Non- reflecting films
- f) Visibility of fringes

3) **Diffraction:**

- a) Single, slit, quantities and qualitative
- b) Circular aperture
- c) Double slit pattern
- d) Multiple slits- grating
- e) Reflecting grating and the zone Plate

4) **Polarization:**

- a) Polarization of transverse waves- light as transverse waves
- b) Double refraction, principle plane, Nicol prism, Plane- polarization
- c) Circular, elliptic polarization production, detection and behavior
- d) Optical activity- Fresner's half shade polarimeter
- e) Basic principles of Holography

5) **Spectrum**

- a) Sources of spectrum, Bunsen-carbon- mercury- sodium
- b) Emission and absorption spectra- classification- visible- ultraviolet and infrared spectra- electromagnetic

- 6) **Scattering:**
 - a) Rayleigh's scattering
 - b) Raman scattering
- 7) **Surface Tension**
- 8) **Viscosity**

Lecture Topics for Principles of Lighting

- 1. Visual Tasks- Factors affecting Visual tasks
- 2. Modern theory on light and colour- synthesis of light
- 3. Additive and subtractive synthesis of colour
- 4. Light Sources- Modern light sources, spectral energy, distribution, luminous efficiency, colour temperature, colour rendering
- 5. Illumination- Luminous flux, candela, solid angle
- 6. Illumination- Utilisation factor, depreciation factor
- 7. Lightening installation – glare, luminaries, lightning fixtures, types of lightning
- 8. Requirements for illuminations of workplace
- 9. Typical lightning installations
- 10. Typical lightning installations
- 11. Specialized aspects of illumination, endoscopes, headlamps
- 12. Photometry- measurement of illumination, photometers and filters
- 13. Eye care and lightning-special care

Physical Optics

Practicals

- 1. Determination of cardinal points of lens system
- 2. Fresnel's bi-prism experiment
- 3. Grating- wavelength determination
- 4. Newton's Rings- radius of curvature, Newton's Rings- refractive index of a liquid
- 5. Reflection grating
- 6. Resolving power of a telescope
- 7. Spectroscope, determination of refractive index of prism
- 8. Thickness of thin glass plate
- 9. Use of telescopes in small observatory

C104 Geometrical Optics (I)

1. **Scope and Objective-** The Geometric Optics is the basis for clinical refraction and to study the eye. The derivative of various formulae for refraction in spherical surfaces and lens are discussed.
2. **Text and Reference Books**
 - a. Geometrical, Physical and Visual Optics- Michael Keating Butterworth Heinemann
 - b. A Textbook of Optics: N. Subramaniam & Brij lal
 - c. Fundamentals of Optics: F.A Jenkins & H.E. White
 - d. Physics for Ophthalmologist- Douglas J Coster

Lecture Topics

1. Photometry
 - a) Basic concepts and definitions in Photometry
 - b) Reflection co-efficient, transmission co-efficient, powers- transmitted and reflected- Lumen Bodhun photometer
2. Refraction through Spherical Surfaces:
 - a) Introduction- Lens shapes, vergences and conversion factors. Divergence and convergence of waves fronts by spherical surfaces. How spherical lenses work- primary and secondary focal points- predictable rays.
 - b) Spherical refracting interfaces- convex, concave, derivation of vergence equation, sagittas, dioptric power- focal points, nodal points and plane. Symmetry points, imaging examples, lateral magnification
 - c) Thin lens equation- lenses in contact separated. Two lens systems- reduced system - vergence effectivity equation
 - d) Application- calculation of image points, dioptric powers in reduced systems using vergence techniques
 - f) Thick lenses- front and back vertex powers- reduced system- dioptric power of equivalent lenses, cardinal points. Application- to calculate the equivalent dioptric power of thick meniscus lens, Plano convex, vertex powers position of principal planes, di-optric powers using reduced systems. Matrix theory and lens matrices.
3. Aberrations:
 - a) Chromatic aberrations- dispersion without and deviation without dispersion
 - b) Dispersion by a prism – angular dispersion- dispersive power- dispersion without deviation and deviation without dispersion. Achromatic prism and lenses- prism diopters.
 - c) Monochromatic aberrations- first order and third order theory
 - d) Spherical aberrations, coma, astigmatism, curvature, distortion- causes and the methods of minimizing aberrations.
 - e) Tangent condition for elimination of distortion
4. Fiber Optics- Introduction and uses, general applications in Ophthalmic & Optical Industry
5. Color Theories- tri-chromatic color measurement
6. Optical Instruments- spectrometer-simple and compound microscope- telescope-Fresnel's bi-prism- Resolving power of optical instruments- Dispersive power-magnifying power of simple and compound microscope, telescope

7. Application of vergence technique to calculate dioptric powers, separation distances in microscopes and telescopes.

Geometrical Optics Lectures by Physics Faculty

1. Rectilinear propagation, Shadows, Huygen's principle
2. Reflection at plane mirrors, multiple reflections
3. Reflection, refractive index, velocity of light
4. Vergence Power of single surface Ray tracing
5. Thin lens Image formation Conjugate foci
6. Lens aberrations- general
7. Lens aberrations- correction
8. Astigmatic pencils
9. Chromatic aberrations of lenses and its correction
10. Total internal reflection prism deviation
11. Minimum and maximum deviation- achromatic prisms
12. Spherical, cylindrical and toric surfaces
13. Aspheric surfaces and lenses
14. Coaxial systems of spherical surfaces, Reduced vergence
15. Coaxial systems of thin lenses
16. Stops and aperture in lens system
17. Thick lenses and lens system
18. Thick lenses-advanced
19. Dispersion spectra
20. Magnification and magnifiers
21. Microscopes introductory
22. Microscope design
23. Telescopes- History and principles
24. Telescopes- Designs and uses
25. Holograms

Geometric Optics

Practical

1. Refraction through a slab and a curved surface
2. Spherometer and lens gauge
3. Surface power, Spherometer and ray tracing
4. Apparent depth method for refractive index
5. Critical angle- glasses and water
6. Prism deviation and internal reflection
7. Dispersion of prisms
8. Lens system, effects of separations
9. Chromatic aberrations of simple lens
10. Magnifiers – measurement of effects
11. Magnifying power of a simple and a compound microscope, telescope
12. Microscope systems

C105 Dispensing Optics I

1. **Scope and Objective:** Imparting knowledge about surfacing and polishing, spherical sphero- cylindrical and bifocal spectacle lenses. To cut finished lenses according to various frame shapes and sizes and fit them in to frames after glazing. Make them capable of assessing facial and frame shape and size. They are taught to evaluate all parameters, which are essential for an ideal spectacle fit. To check any defects in a finished lens before dispensing the lenses to a patient.

2. Text and Reference Books

1. Ophthalmic Prescription work: 2nd Edition, A.G. Bennett Simon J.L. Blumlein
2. Ophthalmic Dispensing and Workshop Practice: WS Topliss
3. System of ophthalmic dispensing: Clifford W. Brooks & Irvin M Boris
4. Spectacle Lenses- Theory and Practice- Coling Fowler, Butterworth Heinemann
5. Ophthalmic Lenses and dispensing- M Jalie, Butterworth Heinemann
6. Spectacle Lenses- Theory and practice – Colin Fowler, Keziah Latham
7. Ophthalmic Lenses and Dispensing- M Jalie

Lecture Topics

1. Introduction – light, mirror, reflection, refraction & absorption
2. Definitions- Prisms, Lenses, Frames, Spectacles
3. Prisms- definition, Properties, Refraction through prisms units
4. Prisms- uses of prisms, Nomenclature prisms
5. Thickness difference and base-apex notation
6. Sign Conventions
7. Lenses- Definition, Terminology used to describe lenses
8. Form of Lenses- Convex lenses & Concave lenses
9. Refraction and image formation through convex and concave lenses
10. Determination of focal length and dioptric power of lens
11. Surface power and radius/ refractive index values
12. Vertex distance and vertex power
13. Effectivity and effective powers
14. Lens shape size, Types i.e. Spherical, Cylindrical, Sphero- cylindrical
15. Toric surfaces and their significance, Toric lenses
16. Sturm's conoid
17. Neutralization of lenses
18. Spherometer & sag formula
19. Foci meter- power of lens and prisms
20. Center marking and Axis marking by foci meter
21. Simple Transposition
22. Toric Transposition
23. Prismatic effect, Centration, decentration, Prentice's rule
24. Prismatic effect of sphero- cylinders and Plano cylinders
25. Differential prismatic effects
26. Decentration of lenses and edge thickness
27. Decentration- examples
28. Components and interpretation of spectacle prescription
29. Prescription mistakes commonly made
30. Prismatic effect of sphero- cylindrical lenses
31. Aberrations in Ophthalmic lenses

32. Tilt induced power in spectacle lenses
33. Magnification in high plus lenses
34. Minification in high minus lenses

Ophthalmic Lenses Types, Manufacturing, Workshop Practice

1. Prescription laboratory in action
2. Instruments for making lenses
3. Outline of lens surfacing and polishing
4. Recording and ordering of ophthalmic lenses
5. Terminology used in Lens workshops
6. Ophthalmic raw materials- history and general outline
7. Manufacturing of Ophthalmic blanks- Glass
8. Glass lenses- material types and characteristics
9. Glass working- spherical surfaces
10. Glass working- Toric and A spherical
11. ISI Standards for lenses
12. Ophthalmic lens designs- best form lenses
13. Design of high-powered lenses
14. Bifocal design and manufacture
15. Faults in lenses- description
16. Faults in lenses- detection

Spectacle Frames- Theory basics (I)

1. History of spectacles
2. Nomenclature and terminology
3. Types and Parts of spectacle frames
4. Spectacle frames- sides and joints
5. Spectacle frame bridge
6. Shapes of spectacle frames- advantages and disadvantages
7. Spectacle frame measurements and markings

C106 Computers for Optometry

1. Scope and Objective- This course aims at preparing the student to handle personal computers, learn basics of the current hardware and software being used. The student should be able to complete his Optometry and other professional assignment like project report, projection slides, using a personal computer. He may be required to use special software programs in his career as an optometrist in the future. He may be required to use special software programs in his career as an optometrist in the future. He should be well versed with printing all the work he has done for his assignments, use email and Internet to his professional advantage.

2. Text and Reference Books

- a. Introduction to Personal Computers
- b. Personal Computers for dummies

Lecture Topics

1. Introduction to Computers- hardware and software
2. Introduction to Operating Systems and basic software
3. Use of Word processors, Spreadsheets, and Presentation programs
4. Use of Database software for clinic records
5. Use of financial accounting software
6. Use of computers in medicine, especially ophthalmic optics
7. Use of specialized software for Optometric use

C201 Ocular Anatomy

- 1) **Scope and Objective:** The Optometry students should learn the basic structure of an eyeball various parts and the importance of each an every part with there function and anatomical presence. This course mainly focused on various structures of an eyeball in relation with body and other various organs like brain because an eyeball contributes 95 % day to day activities, which are human being perform is totally depend of eyeballs.
- 2) **Text and Reference Books:**
 - A) Ocular Anatomy & Physiology – A.K. Khurana
 - B) Anatomy & Physiology – Ross & Wilson
 - C) General Anatomy for Nursing – Smita Kulkarni

Lecture Topic

1. Osteology of skull- Norma frontalis, lateralis , verticalis , occipitallis, basallis.
2. Foetal skull and growth changes.
3. Bones forming the orbital margins and orbit.
4. Osteology of maxilla, maxillary sinus ad its clinical importance, Dentition
5. Development of the eye ball
6. Blood Supply of Orbit
7. - Nerve supply of the eyeball
 - Optic nerve
 - Oculomotor and Trochlear nerve
 - Trigeminal and Abducent nerve
 - Facial nerve
8. Sympathetic and Parasympathetic nerves in relation to orbit and eyeball.
Lesions of Autonomic nervous system with resultant effects – Horner's syndrome
9. Functional areas for vision – lower and upper visual centers
10. Anatomy of skull
11. Anatomy of Orbital cavity
12. Ocular Adnexa,
13. Anatomy of Lacrimal apparatus
14. Anatomy of Eye ball (Sclera, uveal tract, retina)
15. Anatomy of angle of anterior chamber.
16. Anatomy of Crystalline lens.
17. Movement of eyeball and extra ocular muscles.
18. Orbital Blood Vessels.
19. Cranial nerves- optic, oculomotor, trochlear, abducent.
20. Autonomic Nervous System.
21. Visual Pathway.

C202 Ocular Physiology

- 1) **Scope and Objective:** The Optometry students should learn the Basic structure of an eyeball, it's construction, the working and the various functions of each part of an eyeball. This course helps the students for the correct diagnosis and treatment of various ocular conditions.
- 2) **2)Text and Reference Books:**
 - a) Ocular Anatomy & Physiology – A.K. Khurana
 - b) Ocular Physiology – Arvind Eye Hospital
 - c) The Basic of Ocular Physiology – Chatterge

Lecture Topic

1. **The Eyelids**
 - Secretions of the eyelid
 - Reflex blinking
 - Blepharo-spasm
 - The eyelids during sleep
2. **The Lacrimal apparatus**
 - The tear film- structure and formation
 - Production of tears
 - Clinical correlations
3. **The Cornea**
 - Optical Characteristics
 - Physiology, cell biology and biochemistry
4. **Somatic Sensations from the eye**
 - Degeneration and regeneration of corneal nerve fibers
 - Sensations from the cornea
5. **The Extra ocular Muscles**
 - Actions of the extra ocular muscles
 - Physiology of extra- ocular muscle fibers
 - Pharmacology of the extra-ocular muscles
 - The conjugate eye movement system (ocular motility)
6. **Ocular Circulation**
 - Fine structures and blood ocular barriers
 - Control of blood circulation
 - Nervous control of blood circulation
 - Formation and drainage of tissue fluid in the eye
7. **The Aqueous Humor**
 - Formation of aqueous humor
 - Composition of normal aqueous humor
 - Alterations of aqueous humor (pathological changes)

8. Intra-ocular Pressure

Intra-ocular pressure: a dynamic equilibrium
Tonography

9. The Lens

Composition of Lens
Overview of lens metabolism
Cataract – general considerations
Diabetic and galactosemic cataract (sugar cataract)
Ultraviolet light and cataract

10. Accommodation and Presbyopia

11. The Vitreous

Physiology and functions of the vitreous
Ageing of the vitreous

12. The Pupil

Anatomy, Physiology,
Pharmacology of the pupil,
Afferent pupillary defects,
Tonic pupil,
Pupillary light – near dissociation,
Horner's syndrome,
Anisocoria

13. Entoptic Phenomenon (Imagery)

Imperfections in the ocular media,
Entoptic images arising from tear film and cornea
Entoptic images produced within the vitreous
Vitreoretinal sources of entoptic images
Moore's lightning streaks,
Phosphenes of quick eye movement,
Purkinje figures: images of the retinal blood vessels,
The blue field entoptic phenomenon (flying spots)
Choriocapillary circulation,
Entoptic images influenced by the distribution of retinal nerve fibers: blue arcs
of the Retina,
Entoptic images arising from the outer plexiform layer: Haidinger's brushes,
Entoptic phenomena caused by the properties of retinal photoreceptors

14. Visual Adaptation

Mechanisms of visual adaptation,
Dark adaptation and regeneration of rhodopsin,
Adaptation of photoreceptors,

15. Visual Acuity

Specifications of the stimulus (physical basis)
Retinal anatomy,
Physiologic factors,

- Acuity criteria,
Measurement of ordinary visual acuity (minimum angle of resolution)
Factors influencing visual acuity,
Sinusoidal grating targets,
- 16. The Retina**
Development of the retina,
Pigment epithelium ,
Cellular organization of the retina,
Blood supply of the retina,
Retinal neuroanatomy and its physiologic significance,
Photoreceptors,
Synaptic connections of the retina
Role of glia
- 20. The Optic Nerve**
Normal Physiology,
Pappilledema(optic nerve head swelling),
Optic atrophy,
Glaucomatous changes of optic nerve.
- 21. Electrical Phenomena in the Retina**
The electroretinogram,
The pattern electroretinogram,
Early receptor potential,
The electro- oculogram,
Microelectrode studies of the vertebrate retina
- 22. Color Vision**
Color and the visible spectrum,
Color mixing, metameric matches and complementary wavelengths,
Neural encoding of color,
Congenital & Acquired dyschromatopsias,
- 23. The Central Visual Pathways**
The retino – geniculo- cortical pathway,
Visual field examination
Structure and functions of the lateral geniculate body,
The primary visual cortex,
Extrastriate visual cortex,
Visual deprivation
- 24. Binocular Vision**
Normal adult psychophysics,
Normal development of binocular vision,
Mal development of binocular vision,
Strabismus and amblyopia,
Binocular vision in other animals

II nd term Practicals

- A Hematology-** (lectures cum demonstrations)
- 1 Platelets/ Thrombocytes
 2. Reticulocyte count
 3. Determination of Erythrocyte sedimentation rate and estimation of packers cell volume
 4. Anemia and blood indices
 5. Osmotic fragility of red blood cells
 6. Blood transfusion
- B Clinical Physiology**
1. Clinical examination of I, V, VII, IX, X, XI, XII cranial nerves
 2. Clinical examination of sensory system
 3. Clinical examination of Motor system I
 4. Clinical exam of motor system- II
 5. Clinical examination of eyes
 6. Visual Reflexes
 7. Acuity of vision

C203- Basic Biochemistry

1) Scope and Objectives: Biochemistry is the science concerned with the chemical constituents of living cells and with the reactions and processes they undergo. The major objective of biochemistry is the complete understanding, at molecular level, of all the chemical processes associated with living cells. Biochemistry and medicine are intimately related. Health depends on harmonious balance of biochemical reactions occurring in the body, and disease reflects abnormalities in bio-molecules, biochemical reaction or biochemical processes. Biochemical approaches are often fundamental in illuminating the causes of diseases and in designing appropriate therapies.

2) Text Books

- 1) Textbook of Biochemistry by Vasudevan and Shreekumari
- 2) Biochemistry by U.Satyanarayan
- 3) Essentials of Biochemistry and ocular biochemistry- S.Ramakrishnan, Publication Division, Annamalai University

3) Lecture Topics

1. Role of basic biochemistry in optometry
2. Chemistry of proximate principals. Chemistry of carbohydrates
Classification and biomedical importance of different carbohydrates, Glycosaminoglycans.
3. Chemistry of proteins and amino acids- Classification, properties and functions. Biologically important peptides, de-naturation of proteins
4. Chemistry of lipids- Classification of lipids and biological importance of triacylglycerols, Cholesterol, Phospho-lipids, fatty acids, prosta-glandins
5. Enzymes- General nature with classification, coenzymes, factors affecting enzyme action and their importance, clinical importance of enzymes
6. Vitamins – General nature, Classification, Sources, RDA, active forms, and metabolic role, deficiency manifestations and hyper vitaminosis with emphasis on Vitamin A, C, E, Riboflavin and Inositol
7. Minerals – Biochemical role of Na, K, Mg, Ca, P (Macronutrients) and Fe, Se, Zinc, Copper (trace elements)
8. Metabolism of Carbohydrates
9. Metabolism of Proteins
10. Metabolism of Lipids
11. Hormones- Basic concepts in metabolic regulation with examples. Emphasis on insulin
12. Clinical biochemistry- Blood sugar, urea, creatinin and bilirubin estimation and their significance
13. Ocular Biochemistry- Biochemical aspects in relation to cornea, lens aqueous and vitreous humors, Retina and rods and cones (Structure and function relationship)
14. Biophysics- Colloids, sol, gel, emulsion, dialysis, buffers mode of buffer action, different types of solution, Molar, w/v(percentage) Instrumentation- Colorimetry, Photometry, Spectrometry, Electrophoresis

C204 Basic Pharmacology

1. Scope and Objectives:

Pharmacology is a basis of therapeutics. The students are taught actions, uses adverse effects & mode of administrations of drugs for various diseases

2. Text & Reference Books

- 1) Essentials of Medical Pharmacology: K. D. Tripathi
- 2) Pharmacology & Pharmaco- therapeutics: Satoskar R S & Bhandarkar S.D.

Lecture Topics

1. GENERAL PHARMACOLOGY:

- a) Mechanism of drug action
- b) Dose- response relationships
- c) Pharmacokinetics of drug absorption, distribution, bio-transformation, excretion & toxicity
- d) Factors influencing drug metabolism or drug action

2. ACTION OF SPECIFIC AGENTS:

- a) Ocular steroids and NSAIDs
- b) Anti-coagulants
- c) C.N.S. stimulants and antidepressants
- d) Diuretics and hypertensive agents
- e) Cardiovascular drugs
- f) Histamines and antihistamines
- g) Serotonin
- h) Prostaglandins
- i) Sedatives/ Hypnotics.

3. PRINCIPLES OF OCULAR PHARMACOLOGY:

- a) Preparation and packaging of ophthalmic drugs
- b) General Principles of ocular pharmacology
 - i) Drug action and effectiveness
 - ii) Drug safety
 - iii) Factors influencing the objectively demonstrated response
 - iv) Ocular penetration
 - v) Routes of general and ocular drug administration

4. OPTOMETRIC DIAGNOSTIC DRUGS:

- a) Optometric uses of pharmaceuticals
 - i) Classification of drug use
 - ii) Topical ophthalmic drugs
 - iii) References and drug indices
 - iv) Hazards of ophthalmic drugs
 - v) Surface active drugs
 - vi) Topical anesthetics

b) Principles and classification of autonomic drugs

i) Sympathomimetics

ii) Sympatholytics

iii) Parasympathomimetics

iv) Parasympatholytics

v) Diagnostic use of autonomic drugs

c) Other drugs of optometric interest

i) Physical agents

ii) Germicides and sterilizing agents

iii) Over-the-counter drugs

iv) Dyes and stains

5. OPHTHALMOLOGICAL DRUG USE:

a) Anti-glaucoma drugs

i) Drugs ocular hypertension

ii) Drugs that enhance aqueous outflow

iii) Inhibitors of aqueous secretion

b) Sulfonamides

c) Antibiotics

d) Corticosteroids

e) Anesthetics

f) Photolytic enzymes

C-205 Pathology

1) **Scope and Objective:** The Optometry students should learn the diagnosis of various conditions based on the laboratory investigation where the immediate diagnosis and treatment is not possible. This course is mainly focused on various lab investigation, tests and the current development for diagnosis of various condition.

2) **Text and Reference Books:**

- a) Basic Pathology – Robert Finch
- b) Clinical Pathology – Robbins

Lecture Topic

1. Introduction to Pathology.
Evolution of Pathology, Common definitions.
2. Cell injury
Causes, morphology – Fatty change , necrosis , apoptosis
3. Acute inflammation –
Definition, vascular and cellular events , outcome .
4. Chronic inflammation –
Definition, causes , Granulomatous inflammation , Repair (with special reference to nerve
5. Circulatory disturbances – Oedema, Hyperemia , Thrombosis .
Normal regulatory mechanisms, aetiopathogenesis
6. Embolism – Systemic / Pulmonary embolism.
7. Infarction – Types and morphology .
8. Pathology of Tuberculosis.
General features and pathogenesis.
9. Pathology of Tuberculosis.
Pulmonary and extra pulmonary.
10. Pathology of Leprosy & Syphilis.
Description of lesions.
11. Pathology of Fungal, Viral, Chlamydia infection.
Description of lesions.
12. Neoplasia – Definition, nomenclature, staging, grading.
13. Intraocular tumors & Extraocular tumors.
Description of lesions.
14. Anemia – Definition, Classification of anemia, general features and approach to diagnosis .
15. Leukemia.
Definition, Classification and predisposing factors.

Practical's in Pathology

1. Introduction to Pathology.
2. Cell injury – Fatty change, necrosis.
3. Acute inflammation.
4. Chronic inflammation.
5. Circulatory disturbances.
6. Pathology of Tuberculosis.
7. Pathology of Leprosy and Syphilis.
8. Neoplasia .
9. Ocular tumors.
10. Examination of urine.
11. Examination of Peripheral smear.
12. Anemia, Leukemia.
13. Bleeding disorders.

C206 Microbiology

1) Scope and Objectives:

- To study the characteristics of bacteria viruses, fungi and parasites causing diseases of eye
- To apply the principles of sterilization and dis-infection in hospital and ophthalmic practice
- To understand the pathogenesis of the diseases caused by the above listed organisms in the human body in special reference to the eye infection.
- To apply principles of diagnostic ocular microbiology

2) Text Reference Books

- 1) Ocular Microbiology
- 2) Microbiology for the Health Sciences 3rd edition: Burton G.R.W.St
Louis J.P. Lippincott Co, 1988
- 3) Medical Microbiology- An Introduction to Infectious Diseases, John C. Shennis
- 4) Practical Medical Microbiology and Cytology of Eye- Kathleen Byrle, Eileen Bund, Khalid
Tabbara, Robert Hyndiuk, Butterworth Heinemann
- 5) Parson's Diseases of the eye- Stephen J.H. Miller

List of Lectures

- 1) Morphology of bacteria and cultivation of bacteria
- 2) Sterilization and Disinfection
- 3) General properties of viruses and laboratory diagnosis of fungal infections
- 4) Introduction to parasitology and laboratory diagnosis of parasitic infections
- 5) Diagnosis procedures in ocular microbiology
- 6) Conjunctival infections (Bacterial –I)
- 7) II (Viral) Conjunctival infections
- 8) III (Fungal and parasitic)
- 9) Corneal infection (Bacterial)- I
- 10) Corneal infectious (Viral, fungal)-II
- 11) Infections of Sclera
- 12) Infections of Uveal tract- I (Bacterial)
- 13) Infections of Uveal tract-II (fungal, viral and parasitic)
- 14) Infections of retina
- 15) Infections of lachrymal gland orbit and eyelid-I
- 16) Infections of lachrymal gland- Orbit and eye lid-II
- 17) Hospital acquired infections

List of Practicals

1. Grams, staining
2. ZN stain and modification of ZN stain
3. Fungal stains (Kott mount) (Lactopheral Cotton blue mount)
4. Sterilization
5. Demonstration of Culture media

C207 Ophthalmic Optics

- 1) **Scope and Objective:** The Optometry students should learn the current lenses manufacturing and latest trend of glasses and various varieties available in the industry and market. This course is mainly emphasized on the optics of lenses and properties along with the various uses of glasses for the correction of the error and in ophthalmic instruments.
- 2) **Text and Reference Books:**
 - a) Dispensing Optics – M. Jeilly
 - b) Dispensing Optics – Borish

Lecture Topics

1. Introduction- Vergence and vergence techniques revised. Lens power, and cylindrical lenses
2. Gullstrand's schematic eyes, visual acuity, Stiles Crawford experiment and Binocular telescopes
3. Emmetropia and Ametropia
4. Correction of spherical Ametropia
5. Thin lens model of the eye-angular magnification-magnification of microscope, telescope. Spectacle and relative spectacle magnification. Aperture stops-entrance and exit pupils.
6. Applications-To calculate the angular magnification, dioptric power of spectacles, spectacle magnification, entrance and exit pupils, vertex distances.
7. Presbyopia
8. Aphakia
9. Astigmatism-Applications- For e.g. to calculate the dioptric power, angular magnification of spectacles in aphakic, presbyopic patients. To calculate the position of line image in a spherocylindrical lens.
10. Laser Optics- basic laser principles- spontaneous and stimulated emission. Coherence- spatial, temporal. Laser pumping- population inversion optical feedback- laser resonator stability condition. Gas lasers, and solid lasers, Helium- neon laser-Argon-ion laser-ruby laser. Molecular laser-carbon dioxide, Excimer laser. Semi conductor lasers. Lasers in medicine.
11. Holography
12. Spatial distribution of optical information- modulation transfer functions-spatial filtering-applications

C301 Dispensing Optics-II

1) Scope and Objective- This course deals mainly with the prescription of lenses, prisms and frames. Which form the backbone of optometric practice, prepares the students to work competently and confidently in the clinical environment. Imparting the knowledge about surfacing and polishing, spherical, sphero cylindrical, and bifocal spectacle lenses. To cut finished lenses according to various frame shapes and sizes and fit them into frames after glazing. Make them capable of assessing facial and frame shape and sizes they are taught to evaluate all parameters, which are essential for an ideal spectacle fit. To check any defects in a finished lens before dispensing the lenses to a patient.

2) Text and Reference Books-

- a) Principles of Ophthalmic Lenses: M JALIE
- b) System for Ophthalmic Dispensing: CLIFFORD W BROOKS & IRVIN M. BORISH
- c) Practical aspects of ophthalmic Optics: MARGARET DOWALIBY
- d) The fine art of prescribing glasses without making a spectacle of yourself
BENJAMIN MILDER & MELVIN L. RUBIN

Lecture Topics

Ophthalmic Lenses Types, Manufacturing, Workshop Practice

- 1) Recording and ordering of ophthalmic lenses
- 2) Terminology used in Lens workshops
- 3) Ophthalmic raw materials- history and general outline
- 4) ISI Standards for lenses
- 5) Manufacturing of Ophthalmic blanks- Plastic
- 6) Plastic lenses- material types and characteristics
- 7) Plastic Lens- manufacture
- 8) Ophthalmic lens designs-best form lenses
- 9) Design of high- powered lenses
- 10) Bifocal design and manufacture
- 11) Faults in lenses- description
- 12) Faults in lenses- detection

Types of Ophthalmic Lenses

- 1) Aspheric lenses
- 2) High index lenses
- 3) Bifocal and multifocal lenses-types and characteristics
- 4) Bifocal and multifocal lenses-purposes and choice
- 5) Photo chromatic lenses
- 6) Polaroid lenses
- 7) Tinted lenses- absorptive properties
- 8) Tinted lenses- examples and discussions
- 9) Special purpose lenses

Spectacle Frames- Theory basics (I)

- 1) History of spectacles
- 2) Nomenclature and terminology
- 3) Classification of frames- Temple position, coloration
- 4) Types of frame materials- advantages and disadvantages
- 5) Frame materials- Gold
- 6) Frame materials- basic metal
- 7) Frame materials- Plastics
- 8) Manufacturing of spectacle frames- overview
- 9) Face and frame measurement
- 10) Dyes and colorants- lenses and frames

Spectacle manufacturing-Optician shop (II)

- 1) Dispensing counter organization
- 2) Types of spectacle frames available
- 3) Types of human faces
- 4) Face and frame measurements
- 5) Choice of frames
- 6) Cosmetic dispensing-different types of faces, colors, etc
- 7) Functional dispensing-various professions and age groups
- 8) Special purpose frames and accessories
- 9) Testing of frames- general
- 10) Testing of frames- special
- 11) Recording and ordering of frames and appropriate lenses
- 12) Measurements for ordering spectacles- IPD, marking center, vertex distance calculations
- 13) Special measurements for fitting special lenses- Bifocals, multifocals, prism lenses, etc
- 14) Fitting of lenses in various types of frames
- 15) Glazing and Edging processes
- 16) Glazing of bifocals, high powered, other special lenses
- 17) Faults in lenses- description and detection
- 18) Final checking, adjustments to prescription spectacles
- 19) Final dispensing of spectacles to customer
- 20) Patient complaints, handling and correction
- 21) Repairs of spectacles- Soldering, rivets for metal, plastic frames
- 22) Special types of spectacles and appliances
- 23) Monocells and ptosis crutches

C302 Visual Optics (I)

1. **Scope and Objective:** A sound knowledge of theory in Visual Optics is a pre-requisite for practical training in clinical refraction and related area. The objective of this course is to prepare the candidate through didactic lectures, which he is expected to translate into practice at the clinics.
2. **Text and Reference Books**
 - a. Clinical Optics- Troy Fanin
 - b. Optics and Refraction- LP Aggarwal
 - c. Principles of Optics and Refraction- Duke Elder
 - d. Visual Optics and Refraction- A clinical approach Dravid D. Michael's: The C.V. Mosby & Co. 1985

Lecture Topics

- A) **Review of Geometric Optics**
 1. Vergence and Power
 2. Sign Convention
 3. Spherical refracting surface
 4. Spherical mirror; Catoptrics power
 5. Cardinal points
 6. Magnification
- B) **Optics of Ocular Structures**
 1. Cornea and aqueous
 2. Crystalline lens
 3. Vitreous
 4. Schematic and reduced eye
- C) **Refractive conditions of eye**
 1. Emmetropia
 2. Myopia
 3. Hyperopia
 4. Astigmatism
 5. Presbyopia
- D) **Refractive anomalies and their causes**
 1. Aetiology of refractive anomalies
 2. Contributing variability's and their ranges
 3. Populating distributions of anomalies
 4. Optical component measurements
 5. Growth of the eye in relation to refractive errors
- E) **Accommodation and Convergence**
 - a) Far and Near point of accommodation, range of accommodation, amplitude
 - b) Methods of measurement of Accommodation
 - c) Near point of convergence- significance
 - d) Methods of measurement of Convergence
 - e) Accommodation Convergence/ Accommodation ratio

F) Retinoscopy- principles and methods

- f) Retinoscopy- speed of reflex and optimum condition
- g) Retinoscopy- design consideration
- h) Review of objective refractive methods
- i) Review of subjective refractive methods
- j) Cross cylinder method for astigmatism
- k) Difficulties in subjective tests and their avoidance
- l) Transposition of lenses
- m) Spherical equivalent

Optometric Optics Practical Demonstrations

1. Visual acuity, stereo acuity on emmetropia
2. Myopia and pseudomyopia, myopia and visual acuity
3. Measurement of accommodation – near and far points and range
4. Measurement of Convergence: near point and Adduction and abduction range
5. Practice of Retinoscopy- Emmetropia
6. Practice of Retinoscopy- Spherical ametropia
7. Practice of Retinoscopy- Simple astigmatism
8. Practice of Retinoscopy Compound hyperopia
9. Practice of Retinoscopy- Oblique astigmatism
10. Practice of Retinoscopy- in media opacities
11. Practice of Retinoscopy- in irregular astigmatism
12. Interpretation of cycloplegic retinoscopic findings

C303 Optometric Instruments

- 1. Scope and Objective-** This course gives an in depth knowledge about the construction and working of various instruments used in the Optometric practice and helps the students to use the instruments to an optimum level in diagnosis and management of ocular disorders and help them in maintenance of these instruments
- 2. Text and Reference Books**
 - a. Optometric Instrumentation. Santosh K Kumar
 - b. Optometric Instrumentation- Dravid B. Henson
 - c. Clinical Visual Optics- Bennet & Rabbeetts
 - d. Visual Optics and Refraction- David O. Michales
 - e. Primary Care Optometry-Theoder Grosvenor
 - f. Practical Orthoptics in treatment of squint- T. Keith Lyle & Sylvia Jackson

Lecture Topics

- 1)** Refractive Instruments
 - a. Test chart standards
 - b. Choice of test charts
 - c. Trial case lenses- best forms
 - d. Refractor (phoropter) head units
 - e. Trial frame design
 - f. Near vision difficulties with units and trial frame
 - g. Optical considerations of refractor units
- 2)** Ophthalmoscopes
 - a) Direct Ophthalmoscope-design, uses
 - b) Indirect Ophthalmoscope-design, uses
 - c) Filters for Ophthalmoscopy
- 3)** Slit lamp
 - a) Parts of Slit lamps
 - b) Slit lamps accessories
- 4)** Tonometer
 - a) Tonometer principles
 - b) Types of tonometers and standardization
 - c) Use and interpretation of tonometers
- 5)** Fundus Camera-Principles and technique
- 6)** External eye photography-apparatus & techniques
- 7)** Corneal examination
 - a) Placidos disc
 - b) Keratometer
 - c) Video Keratoscopy
 - d) Corneal Topography
 - e) Specular Microscope
 - f) Aesthesiometer
- 8)** Exophthalmometer
- 9)** Auto-Refractometer

- 10)** Orthoptic Instruments
 - a) Orthoptic instruments- haploscopes
 - b) Orthoptic Instruments- home devices
 - c) Orthoptic instruments- pleoptics
- 11)** Colour vision tests

C304 Clinical Examination of the Eye

1. Scope and Objective: This course is to acquaint the students regarding basic history taking and basic examination technique of a patient attending the Out Patient Department with ophthalmic complaints. The student should also become familiar with certain diagnosis treatments like visual fields, macular function test, to confirm the clinical findings and help aid in diagnosis.

2. Text Reference Books

- a. External Eye Diseases- A Color Atlas- Mark T Watts Butterworth Heinemann
- b. Clinical Procedures for ocular examination- Carlson
- c. External Eye Diseases a systematic approach – Ian Mackie, Butterworth Heinemann
- d. Clinical Examination of Ophthalmic cases- M.L. Aggarwal & L.C. Gupta
- e. Clinical optometry, Jack K. Kansi, Butterworth 2nd Ed, 1989
- f. Basic and Clinical Sciences- American Optometric Association
- g. Clinical Procedures in primary eye care- David Elliott
- h. Diagnosis of defective color vision- Jennie Birch, Butterworth Heinemann

Lecture Topics

1. History of the ophthalmic subject
2. Visual acuity testing- distance and near and colour vision
3. Examination of muscle balance
4. Slit lamp examination & Technique
5. Examination of intra-ocular pressure and angle of anterior chamber
6. Ophthalmoscopy- Direct and indirect
7. Examination of lachrymal system
8. Examination of orbit
9. Macular function test
10. Visual field charting (central) (Peripheral)
11. Neuro- Ophthalmologic examination

C305 Ocular Diseases –I

1. Scope and Objective:

This course is designed to provide the Optometrist with a Comprehensive yet concise Curriculum of the field of Ophthalmology with reference to ocular diseases.

The course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination in various sub-specialties of Ophthalmology

2. Text and Reference Books

- a. Basic and Clinical Science Course, American Academy of Ophthalmology (AAO), 1992-93/ 1993-94
- b. Parsons Diseases of the eye, Stephen J.H. Miller, 17th Edition 1984, Churchill Livingstone
- c. Clinical Ophthalmology, Jack J Kanski, 2nd Edition, 1989, Butterworth's
- d. The Ocular Disease Manual- Mayler Robertson

Lecture Topics

1. Eyelids

- a) Eyelid anatomy
- b) Congenital and developmental anomalies of the eyelids
- c) Blespharospasm
- d) Ectropion
- e) Entropion
- f) Trichiasis and symblepharon
- g) Eyelid and inflammations
- h) Eyelid tumors
- i) Ptosis
- j) Eyelid retraction
- k) Eyelid trauma

2. Lachrymal System

- a. Lachrymal gland anatomy
- b. Lachrymal pump
- c. Congenital and developmental anomalies of the lachrymal system
- d. Lachrymal obstruction
- e. Lachrymal sac tumors
- f. Lachrymal trauma

3. Sclera

- a. Ectasia and staphyloma
- b. Scleritis, episcleritis

4. Orbit

- a. Orbital anatomy
- b. Incidence of orbital abnormalities
- c. Methods of orbital examination
- d. Congenital and developmental anomalies of the orbit
- e. Orbital tumors
- f. Orbital inflammations
- g. Sinus disorders affecting the orbit
- h. Orbital trauma

5. Conjunctiva and Cornea

a) Inflammations

- b) Tumors
 - 1. Tumors of epithelial origin
 - 2. Glandular and adnexal tumours
 - 3. Tumors of neuro-ectodermal origin
 - 4. Vascular tumours
 - 5. Xanthomatous lesions
 - 6. Inflammatory lesions
 - 7. Metastasis lesions

b) Degenerations and dystrophies

c) Miscellaneous conditions

- 1) Kerato-Conjunctivitis Sicca
- 2) Stevens- Johnson Syndrome
- 3) Ocular Rosacea
- 4) Atopic eye disorders
- 5) Benign muscosal pemphigoid- ocular pemphigoid
- 6) Vitamin A Deficiency
- 7) Metabolic diseases associated with corneal changes

6. Iris, Ciliary body and Pupil

- a) Congenital anomalies
- b) Primary and secondary disease of iris and ciliary body
- c) Tumors
- d) Anomalies of pupillary reactions

7. Choroid

- a) Congenital anomalies of the choroid
- b) Diseases of the choroid
- c) Tumors

C401 Optometric Optics (I)

1. Scope and Objective: Optometric Optics is more a clinical oriented course. The object of the course is to prepare the student to correlate all aspects of Optics, clinical examination, diagnosis and planning Optometric management of the patient.

2. Text and Reference Books

- a. Practice of Refraction- Duke Elders, Ed.9.1991
- b. Optics for clinicians – Melvin L.Rubin, Triad 2nd Ed,1974
- c. Fine art of prescribing glasses- Melvin L.Rubin and Benjamin Milder

- d. Clinical optics- Troy Fenin and Theodore Grosvenor
- e. Low Vision- Christine Dickinson

Lecture Topics

- 1) a) Axial versus refractive ametropia
 - b) Correction of spherical ametropia
 - c) Ocular refraction versus spectacle refraction
 - d) Ocular accommodation versus spectacle accommodation
 - e) Retinal image blur, depth of focus and depth of field
- 2) Measurement of the optical constants of the eye
 - a) Corneal curvature and thickness
 - b) Keratometry
 - c) Curvature of the lens and ophthalmometry
 - d) Axial and axis of the eye
 - e) Far and Near Point of Accommodation
- 3) Introduction to Orthoptics
 - a) Extra Ocular Muscles
 - b) Laws of ocular motility
 - c) Accommodation and Convergence
 - d) Binocular Vision
 - e) Diplopia, Confusion
 - f) Type of Deviations
 - g) Introduction to Orthoptic examination
 - h) Introduction to Orthoptic instruments

Optometric Optics Practical Demonstrations

1. Visual acuity, stereo acuity in emmetropia
2. Myopia and pseudomyopia, myopia
3. Myopic correction- subjective verification- monocular and binocular
4. Hypermetropia- determination of manifest error subjectively
5. Hypermetropic correction: subjective verification
6. Demonstration of astigmatism Use of slit and keratometry to find the principal meridians
7. Astigmatism: Fan – subjective verification tests
8. Astigmatism: Cross Eye – subjective verification tests
9. Measurement of accommodation: near and far points and range
10. Presbyopic correction and methods: accommodation reserve, balancing the relative accommodation and cross grid test
11. Methods of differentiating axial and refractive ametropia
12. Practice of Retinoscopy- Emmetropia
13. Practice of Retinoscopy: Spherical ametropia
14. Practice of Retinoscopy: Simple astigmatism
15. Practice of Retinoscopy: Compound hyperopia

C402 Visual Optics II

1. Scope and Objective: Imparting the knowledge about surfacing and polishing, spherical, spherocylindrical and bifocal spectacle lenses. To cut finished lenses according to various frame shapes and sizes and fit them into frames after glazing. Make them capable of assessing facial and frame shapes and size. They are taught to evaluate all parameters which are essential for an ideal spectacle fit. To check any defects in a finished lens before dispensing the lenses to a patient.

2. Text and Reference Books

- a. System of Ophthalmic Dispensing : Clifford W. Brooks and Irvin M. Borish
- b. Spectacle Lens technology- D.F.Horne
- c. Practical aspects of Ophthalmic Optics; Margaret Doalib
- a. Professional Ophthalmic Dispensing: Ralph Drew

Lecture Topics:

- 1)
 - a. Tinted and protective lenses
 - b. Characteristics of tinted lenses
 - c. Absorptive glasses
 - d. Polarising filters
 - e. Photochromic filters
 - f. Reflecting filters
- 2) Bifocal lenses
- 3) Trifocal lenses
- 4) Progressive addition lenses
- 5) Lenticular lenses
- 6)
 - a) Spectacle magnifiers
 - b) Recumbent prisms and Fresnel prisms
 - c) Reflections from spectacle lenses, ghost images, reflections in bifocals at the dividing line
 - d) Anti- reflection coating
 - e) Size, shape and mounting of Ophthalmic lenses
- 7) Effective power of spectacles vertex distance effects
- 8) Spectacle magnification and relative spectacle magnification

C403 Low Vision Aids

1. Scope and Objective: Patient both young and old, who suffer from irreversible and incurable conditions which cannot be managed by conventional therapy, can be helped to perform their tasks with Low Vision Aids, prescribing of which is a special of Optometrists.

2. Text Book & Reference Books:

- a) Low Vision Care-EDWIN B.MEHR & ALLAN N. FREID The professional press, Chicago 1975
- b) Optometric Management of visual Handicap-HELEN FARRALL, Blackwell scientific Publications, London 1991
- c) Art and practice of low vision-Paul freeman, Butterworth Heinemann

Lecture Topics

- 1.** Identifying the low vision patient
- 2.** History
- 3.** Refraction
- 4.** Evaluating near vision: Amsler Grid and fields defects
- 5.** Demonstrating aids
- 6.** Teaching the patient to use aids
- 7.** Guide to selected low vision aids
- 8.** Fitting spectacles telescope and glasses
- 9.** Children with low vision
- 10.** Effects of the eye condition on functional vision
- 11.** Light, glare and contrast in low vision care and rehabilitation
- 12.** Diagnostic procedures in low vision cases management
- 13.** Optics of low vision lenses
- 14.** Bioptic telescopes
- 15.** Optical devices to help people with field defects

C404 Ocular Diseases (II)

1. **Scope and Objective-** This course is designed to provide the further Optometrist with a comprehensive yet concise Curriculum of the field of Ophthalmology, with reference to ocular diseases. The course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination in various subspecialties of Ophthalmology.
2. **Text and Reference Books:**
 - a. Basic and Clinical Science Course- American Academy of Ophthalmology
 - b. Parsons Diseases of the eye- Stephen J.H.Mille, Churchill Livingstone
 - c. Clinical Ophthalmology- Jack J. Kanski, Butterworth
 - d. The Ocular Disease Manual- Meyler Robertson
 - e. Manual of ocular Fundus- Jones, Butterworth Heinemann

Lecture Topics

1. Vitreous
 - a. Development abnormalities
 - b. Hereditary hyaloido retinopathies
 - Juvenile retinoschisis
 - Cholesterolosis
 - c. Vitreous haemorrhage
 - Blunt trauma and the vitreous
 - Inflammation and the vitreous
 - Parasitic infestations
 - d) Vitreous complications in cataract surgery
2. Retina
 - a. Retinal vascular diseases
 - b. Diseases of the choroidal vasculature, Bruch's membrane, and retinal pigment epithelium
 - c. Retinal tumors and retinoblastoma
 - d. Other retinal disorders
 - 1) Retinal inflammations
 - 2) Metabolic diseases affecting the retina
 - 3) Miscellaneous disorders
 - 4) Electromagnetic radiation effects on the retina
 - e. Retinal physiology and psychophysics
 - f. Hereditary macular disorders (including albinism)
 - g. Peripheral retinal degenerations
 - h. Retinal holes and detachments
 - i. Photocoagulation
- 3) Neuro Ophthalmology
 - a) Neuro Ophthalmic examination

- 1) History and Visual function testing
 - 2) Technique of pupillary examination
 - 3) Ocular motility
 - 4) Check list for testing
 - b) Visual sensory system
 - 1) The retina, optic disc, optic nerve, optic tracts
 - 2) The lateral geniculate body, optic radiations, visual complex
 - 3) The visual field
 - 4) Disorders of visual integration
 - c) Ocular motor system
 - 1) Supranuclear control of eye movements
 - i) Saccadic system
 - ii) Clinical disorders of the saccadic system
 - Gaze palsies
 - Parkinson's disease
 - iii) Smooth pursuit system and disorders
 - iv) Non-visual reflex system
 - v) Position maintenance system
 - vi) Nystagmus
 - 2) Ocular motor nerves and medial longitudinal fasciculus
 - d) The facial nerve
 - e) Pain and sensation from the eye
 - d) Autonomic nervous system disorders
 - e) Selected systemic disorders and Neuro- ophthalmologic signs
4. Lens
 - a) Anatomy and pathophysiology
 - 1) Normal anatomy and aging process
 - 2) Developmental defects
 - 3) Acquired lenticular defects
 - a) Management of lenticular defects
5. Trauma
 - a. Anterior segment trauma
 - b. Posterior segment trauma
6. Blindness
 - a. Blindness- definitions
 - 1) Causes
 - 2) Social implications
 - 3) Rationale in therapy
 - b. Drug induced ocular diseases

C405 Optometric Investigations

1. **Scope and Objective-** This course is designed to provide Optometrist with a comprehensive and concise understanding of all ophthalmic investigations. The Course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination and instruments expected to be used by an Optometrist in an Ophthalmic hospital as well as in an optical establishment.

2. **Text and Reference Books**
 - a) Clinical procedures in Primary Eye Care- David Elliot, Butterworth Heinemann
 - b) Basic and Clinical Science Course, American Academy of Ophthalmology
 - c) Clinical Ophthalmology Jack K Kanski, 2nd ed, 1989, Butterworths

Lecture Topics

1. Visual Acuity Testing & Theory
2. Color Vision Testing & Theory
3. Electro Retino-graphy. ERG
4. Electro Oculo-graphy, EOG
5. Electro Myo-graphy EMG
6. Electro Nystagmo-graphy
7. Flourscein Angiography
8. Ultrasonography
9. Visual Evoked Response/ Potential V.E.R or V.E.P
10. Tonometer, Tonometry & Tonography
11. Visual Field Charting & Perimetry
12. Adaptation & Adaptometry
13. Berman's Locator
14. Cryo Technique
15. Diathermy
16. Photo-coagulation
17. Methods of examination (Focal illumination)
18. Slit lamp & Attachments
19. Gonioscopy
20. Pachometry
21. Ocular Photography (Ant. Seg)
22. Contact & Trans illumination
23. PH Testing & Schemer's Test
24. Fluorescence in Staining & Techniques
25. Syringing& Lachrymal Techniques
26. Ophthalmoscopy
27. Retinoscopy
28. Auto- Refraction
29. Keratometry
30. Ophthalmic Lens Measuring Instruments

C406 Hospital Procedures and Public Relations

Lecture Topics

1. Administration
2. Medical Records department
3. Reception
4. Computer Section- appointment scheduling, accounts
5. Laboratory- all investigations performed
6. Correspondence
7. Stores

C406B Public Relations

Defining the subject

1. Definitions
2. Public Relations- its distinction from publicity, propaganda, and advertising
3. The universe of Public Relations- internal and external aspects of PR
4. Phases of PR- Analysis of the internal and external environment- formulating and implementing PR policy – feedback, research and evaluation
5. The benefits of PR- Image building, promotion of product or services, better employee, government and community relations

Methods of Public Relations

1. Press Relation: Writing and issuing a press release- Press conference- facility visit and open house- letters to the editor- assembling press activity
2. The printed word: Style, color and design- knowledge of typography and layout- direct mail, publicity material and house journal. Use of photographs for publication and special events
3. The spoken word: Public speaking – Microphone technique- Telephone manners
4. Radio and Other Audio media: communicating by cassettes- radio interview, discussion and other programs
5. Film and Television: Publicity and educational use of these media- production and distribution
6. Research in PR: Opinion and panel research – drawing up of a questionnaire – interpreting the results

Public Relations in Action

1. The employee public: The working relationship- Labor management relations, Establishing effective leadership Planned effort at PR
2. The customer public: Need of customers- efficiency and effectiveness of customers severe feedback and suggestion system

3. The government public: Knowledge of and interaction with Central Government- State Government and Municipal Governed
4. The community public: Community opinion- community relation- open house and volunteer activities

Specialized Public Relations

1. Public Relation for welfare agencies
2. Public Relation for Health agencies
3. Public Relation for Hospitals
4. a. The perspective: Rising public demands- escalating costs- charitable heritages- public opinion consciousness- growing consumer movement
5. b. The P. R. Program: Employee relations- volunteer groups- medical staff- patient sensitivity to the press and other media

C-501 Orthoptics & Binocular Vision

1. Scope and Objective-

A sound theoretical knowledge of the binocular vision paves the way for clear understanding of the physiology of the eye in the clinics. The theories of binocular vision and basics of Orthoptics included in the theory, forms the background for the student to understand binocular vision and ocular motility disorders.

2. Text and Reference Books

- a. Comprehensive review of Orthoptics and ocular motility- theory, therapy, surgery- 2nd edition, Jane Hurrt, Antonia Rasicovia, Charles Windsor- CV Mosby
- b. Von Noorden's Binocular Vision and Ocular Motility- Gunter K von Noorden, 2nd edition, C.V. Mosby & Co
- c. Handbook of Orthoptic principles – GT Willonghby Cashell, Isobel Durran, Churchill Living stone
- d. Binocular Vision – Foundations & Applications
- e. Strabismus- Fourth Edition- Julio Prieto Diaz- Butterworth Heinemann

Lecture Topics

- 1) General Introduction
- 2) Binocular Vision and Space perception development
 - a) Fusion, diplopia, correspondence
 - b) Stereopsis, Panum's area, BSV
 - b) Stereopsis and monocular clues- significance
 - c) Theories of Binocular vision

- d) Relative subjective and visual direction
- e) Alternation- theory of Binocular Vision
- f) Projection Theory of Binocular Vision
- g) Motor theory of visual orientation
- 3) Summary of Anatomy of Extra Ocular Muscles
 - a) Rectii and Obliques, LPS
 - b) Innervation & Blood Supply
- 4) Physiology of Ocular movements
 - a) Center of rotation, Axes of Fick
 - b) Action of individual muscle
- 5) Laws of ocular motility
 - a) Donders's and Listing's law
 - b) Sherrington's Law
 - c) Hering's Law
- 6) Uni-ocular & Binocular movements- fixation, saccadic & pursuits
 - a) Version & Vergence
 - b) Fixation & field of fixation
- 7) Nystagmus
- 8) Near Vision Complex
 - a) Accommodation
 - i) Definition and mechanisms (process)
 - ii) Methods of measurement
 - iii) Stimulus and innervation
 - iv) Types of Accommodation
 - v) Anomalies of accommodation- aetiology and management
 - b) Convergence
 - i) Definition and mechanism
 - ii) Methods of measurement
 - iii) Types and components of convergence- Tonic, accommodation, fusional
 - iv) Anomalies of Convergence- aetiology and management
 - c) Pupillary Constriction
 - a) Relation to Accommodation and Convergence
 - b) Physiologic significance
 - c) Reaction to fusion
- 9) Visual Acuity
 - a) Definition & basic concepts
 - b) Factors of affecting Visual acuity
 - c) Optical effects of spectacles
 - d) Aniseikonia
- 10) Sensory & Motor adaptations
- 11) Amblyopia
 - a) Definition & types
 - b) Investigations
 - c) Management

C-502 Major Eye Diseases

1. **Scope and Objective-** To learn in details of the etiology, differential diagnosis and management aspects of major eye diseases which are main causes of blindness in India. The scope of the course should cover how an Optometrist can play a vital role in diagnosis and management of such diseases when he is working as part of a medical team or even in private clinic. Points about urgent, emergency and routine referral of patient with diagnosed of such diseases should be understood by the student.
2. **Text and Reference Books**
 - a) Manual of Ocular fundus examination- Theo Dorion- Butterworth Heinemann
 - b) Cataract- William Douthwaite, Butterwoth Heinemann
 - c) Glaucoma- A colour manual for diagnosis and treatment, 2nd edition-Kanski, Salmon, Butterworth Heinemann
 - d) The Glaucoma handbook- Anthony Litwak, Butterworth Heinemann
 - e) Maclar Disorders- Anthony Cavallerano, Butterworth Heinemann

Lecture Topics

1. Cataract
2. Glaucoma
3. Retinal detachment
4. Corneal ulcer & opacities
5. Visual loss- ophthalmic lesion
6. Diabetic Retinopathy
7. Macular degeneration
8. Chemical burns

C-503 Systemic Diseases

1. **Scope and Objective-** The course aims at acquainting the students with certain common medical ailments, which have serious ocular involvement. Basic fact about the patho-physiology of the disease, the clinical features, essentials of diagnosis and basic management will be emphasized with special reference to the eye.
2. **Text and Reference Books**
 - a. Davidson's principles and practice of medicine- J. Macleod C. Edwards & Ian Booheir, ed. John Macleod, 14th edition ELBS/ Churchill Livingstone
 - b. Pathologic Basis of Disease – Robbins, Cottran & Kumar, Igaku- Shoin/ Saunders
 - c. Parson's Disease of the eye- Stephen J.H.Miller 17th edition, Churchill Livingstone
 - d. Clinical Ophthalmology- Jack Kanski, 1st edition, Butterworth
 - e. Essential Immunology- Ivan M Roitt: 6th edition, ELBS/Blackwell Scientific Publications
 - f. Parasitology- K.D. Chatterji, 12th edition
 - g. Medical Handbook of common clinical emergencies- Publishers Ariga, Gowda, Sundar, 2nd edition, Affiliated East- West Press
 - h. Drugs Medications and eye- Michael Doughty- Butterworth Heinemann
 - a. Ocular Manifestations of systematic diseases- Bernard Blaustein- Butterwort Heinemann

Lecture Topics

1. **Arterial Hypertension**
Patho-physiology, classification, clinical examination, diagnosis, complications, management, Hypertension and eye
2. **Diabetes Mellitus**

- Pathology, classification, clinical features, diagnosis, complications, management, Diabetes mellitus and the eye
3. **Acquired Heart Disease - Embolism**
Rheumatic fever- Patho-physiology, classifications, diagnosis, complications, management. Embolism Sub-acute bacterial endo-carditis
 4. **Cancer- Introduction**
Definitions, nomenclature, characteristics of benign and malignant neoplasm
Grading of staging of cancer, diagnosis, principles of treatment
Neo-plasia and the eye
 5. **Connective Tissue Diseases**
Anatomy and patho-physiology: Arthritis
Eye and connective tissue diseases
 6. **Thyroid Disease**
Anatomy and physiology of the thyroid gland, classification of thyroid disease
Diagnosis, complications, clinical features, management, thyroid disease and the eye.
 7. **Tuberculosis**
Etiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment, tuberculosis and the eye
 8. **Helminthiasis**
Classification of helminthiasis diseases, Schistosomiasis, principles of diagnosis and management
Helminthic disease and the eye (Taeria, Echinococcus, Larva migrants)
 9. **Common Tropical Medical Ailments (Malaria, Leprosy)**
Introduction to tropical diseases, malaria
Tropical diseases and the eye- leprosy, toxo-plasmosis, syphilis, trachoma
 10. **Malnutrition**
Etiology, protein energy malnutrition, water electrolytes, minerals, vitamins, nutritional disorders and the eye.
 11. **Introduction to Immunology**
Introduction, components of the immune system, principal of immunity in health, immunology in disease, immunology and the eye
 12. **Neurological Disorders- Stroke/C.V.A.**
 13. **General Medical Emergencies- First Aid**
Ocular/ General
 14. **Genetics**
Introduction to Genetics
Organization of the cell
Chromosome structure and basic principles of genetics
Gene structure and basic principles of genetics
Genetic disorders and their diagnosis
Genes and the eye
Genetic Counseling and genetic engineering

C-504 Contact Lens (I)

1. Scope and Objective-

The subject covers all basic aspects of Contact Lenses. With a revision of Ocular Anatomy & Physiology, Visual Optics, the course will also deal with Optics of Contact Lenses, raw materials and pre- fitting examination.

2. Text and Reference Books

- a. Contact Lens- Dr. V.K. Dada
- b. Contact Lenses Practice- Robbert B. Mandell
- c. R.G.P. Lens Fitting, Carolyn Begley, Butterworth Heinemann
- d. Contact Lenses – Stone J and Phillips A.J. 3rd Edition, Butterworth, 1989

Lecture Topics

1. History of Contact lenses
2. Related ocular anatomy and physiology
3. Related Visual Optics
4. Contact Lens materials, terminology, classification
5. Optics of Contact lenses, comparison spectacles
6. Indications and contraindications
7. Advantages and disadvantages of types of Contact lenses
8. Manufacturing Rigid and Soft Contact Lenses- various methods
9. Pre- fitting examination – steps, significance, recording of results
10. Instruments used for examination
11. Special Investigations in pre- fitting examinations
12. Keratometry and Corneal topography
13. Slit lamp examination
14. Discussion with patient, choice of lens type

15. Fitting philosophies of Contact Lenses- general outline
16. Fitting Rigid Contact Lenses
17. Using trial lenses- calculations involved
18. Methods of assessment of Contact Lens fit
19. Types of fit- Steep, Flat, Optimum- on spherical cornea
20. Types of fit- Steep, Flat, Optimum- on Toric cornea with spherical lenses
21. Types of fit- Steep, Flat, optimum- on Toric cornea with toric lenses
22. Calculation and finalizing of Contact lens parameter
23. Ordering Rigid Contact Lenses- writing a prescription to the Laboratory
24. Checking and verifying Contact Lenses from Laboratory
25. Modifications possible with Rigid lenses
26. Components of Lens care systems for Rigid Lenses
27. Contact Lens solution – composition, necessity, advantages
28. Teaching the patient to insert and remove Rigid lenses
29. Common handling instructions to first time wearers
30. Special instructions to the patient wearing Rigid Gas Permeable Contact lenses

C- 505 Public Health and Community Optometry

1. Scope and Objective: The objective of the course is to enable the student to identify and manage the common and important ocular problems in the community and to investigate an epidemic of ocular diseases and to institute control measures. It is also to assess the effect of social, cultural, and economic characteristics of the community on its health status with special reference to ocular diseases.

- To organize health education programs in the community.
- To elicit participation in national program of prevention of blindness
- To apply the principles of community screening for the diagnosis of visual disorders
- To apply the epidemiological principles to assess the risk factors and for the control of the diseases.

2. Text and Reference Books

- a. Oxford Text Book of Public Health and Preventive Medicine(Vol. I to IV)
- b. Maxcy and Rosenau : Textbook of public health and Preventive Medicine
- c. New Comb R.D. and Jolley JL: Public health and Community Optometry
- d. Textbook of public and Preventive Medicine- (J.E.Part)
- e. Environmental Vision- Donald Pits – Butterworth Heinemann
- f. Work and the eye- Racheal North- Butterworth Heinemann
- g. Ocular immunology in health and disease- Steven Koevary- Butterworth Heinemann
- h. Ophthalmic research and epidemiology- Stanley Hatch- Butterworth Heinemann
- i. Professional communication in eye care- Carolyn Begley- Butterworth Heinemann

Lecture Topics

1. **Philosophy of Public Health**
 - a. History of public health medicine
 - b. History of public health optometry (including epidemiology, manpower, projections, community reimbursement mechanisms)

2. **Health Care Systems**
 - a. Organization of health services (principles of primary, secondary and tertiary care)
 - b. Planning of health services (including relevant legislation and implications to Optometric practice)
 - c. Health economics
 - d. Health manpower protection and in practice of Ophthalmology
 - e. Health manpower protection and in the practice of ophthalmology
 - f. Third party involvement in financing health care services (including both governmental and non-governmental)
 - g. Quality assurance in patient care services

3. **Modes of Health and Vision Care Delivery**
 - a. Solo and group practice modes
 - b. Multidisciplinary, interdisciplinary and institutional practice modes
 - c. Optometry 's role as a primary health care profession

4. **Preventive ophthalmology**
 1. History of Public- Health
 2. History of Public health and epidemiology
 3. Organization of eye care services:
 - Primary Eye Care
 - Secondary Eye Care
 - Tertiary Eye Care
 4. Health Economics
 5. Quality Assurance in Eye Care Services
 6. Modern Management Technique in Curative Services
 7. Community Optometry- Introduction
 8. Sol and Group Practice Modes
 9. Multidisciplinary Interdisciplinary Institutional Practice Modes
 10. Optometry in Public Sector
 11. Optometry in Private Sector
 12. Levels of Prevention in Ophthalmic Disease
 13. Survey & Methods of knowing Burden of Ophthalmic Disease
 14. Role and Scope of Optometrist in P.H Centre
 15. Role and Scope of Optometrist in Rural Centre
 16. School Health Services in Optometry
 17. National Programme of the Control of Blindness
 18. Vision 2020: The Right to Sight

Lectures on Public Health

1. Classification of Foods and Dietetics
2. Nutrients
3. Vitamins, Fat & Water Soluble
4. Vitamin A Sources, Deficiencies and Assessment of Defines
5. Vitamin A Supplementing Methods of Urban & Rural Areas
6. Balanced Diet
7. Nutritional Problem in Public Health
8. P.E.M & Social Aspects of Nutrition
9. Therapeutic Diet
10. Community Nutrition Programmes

Practical's

1. Testing of Refractory Error of School Students
2. Organizing Activity in School, Contacting The Authorities, Formulating The Questionnaire
3. Nutrition Demonstrations
4. Talk- Vitamin A Health Education
5. Role Play
6. Prevalence Study of Vitamin A Deficiency
7. Balanced Diet Demonstration
8. Visit of Anganwadi
9. Visit to Primary Health Centre
10. Visit to a Diagnostic Camp

C-506 Research Methodology And Biostatistics

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

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

C-601 Pediatric Optometry

1. **Scope and Objective**-The scope of this subject is to train the optometrists to develop a systematic way of dealing with children below 12, so as to implement primary eye care and have better, specialized management of anomalies.
2. **Text and Reference Books**
 - a. Pediatric Optometry- Jerome Rosner, Butterworth Heinemann, London 1982
 - Binocular Vision and Ocular Motility- Von Noorden GK Burian Von Noorden's , 2nd Ed. C.V. Mosby, St. Louis,1980
 - b. Assessing children's vision- Susan Leat- Butterworth Heinemann
 - c. Clinical Pediatric optometry- Leonard Press, Bruce Moore- Butterworth Heinemann
 - d. Paediatric Neuro- Ophthalmology- Robert Tomsak- Butterworth Heinemann
 - e. Vision Problems in childhood- Terry Buckingham, Butterworth Heinemann

Lecture Topics

1. History- Genetic factors, prenatal factors, Post natal factors
2. Measurement of visual acuity
3. Normal appearance, pathology and structural anomalies of:
Orbit, Eye lids, lachrymal system, Conjunctiva, Cornea, Sclera,
Anterior chamber, Uveal tract, pupil, Lens, vitreous, fundus
4. Oculomotor system
5. Measurement of refractive status
6. Determining binocular status
7. Determining sensory motor adaptability
8. Remedial and compensatory treatment of strabismus and nystagmus
12. Myopia, Pseudo myopia, hyperopia, Astigmatism, Anisometropia, Amblyopia
13. Vergence and accommodation
14. Pediatric contact lenses
15. Low vision care in pediatric age group

C-602 Occupational Optometry

1. **Scope and Objective**- The objective is to prepare the student to know the visual requirements of various jobs, effects of physical, chemical, and other hazards on eye and vision. The Optometrists should be able to identify occupational causes of visual and eye problems to be able to identify occupational causes of visual and eye problems; to be able to prescribe suitable corrective lenses and eye protective wear and be able to set visual requirements, standards for different jobs.
2. **Text and Reference Books**
 - a. Encyclopedia of Occupational Health and Safety, ILO Publications, 1983, Vol. I and II

- b. IES Lighting Handbook 1984, IES Publication, NY 1985
- c. IES Lighting Education Introductory Lightning, 1985, IES Publications N.Y. 1985
- d. Guide to Occupational and other Visual needs- Holmes C. Jolliff H & Gregg J. 1958
- e. Occupational eye diseases and injuries- Joseph Minton, William Heineann Medical Book, 1949
- f. Environmental Vision- Donald Pits- Butterworth Heinemann
- g. Work and the eye- Rachael North- Butterworth Heinemann
- h. Ocular immunology in health and disease- Steven Koevary- Butterworth Heinemann
- i. Ophthalmic research and epidemiology- Stanley Hatch- Butterworth Heinemann
- j. Professional communication in eye care- Carolyn Begley- Butterworth Heinemann
- k. Sports Vision- D.F.C Loran, CJ MacEween, Butterworth Heinemann

Lecture Topics

1. Introduction to occupational health, hygiene and safety International bodies like ILO, WHO, National bodies like Labor Institutes, National Institutes of Occupational Health, National Safety Council
2. Acts and Rules
Factories Act and Rules
Workmen's Compensation Act, ESI Act
3. Occupational diseases / occupation related diseases caused by physical agents, chemical agents and biological agents.
4. Occupational hygiene/environmental monitoring
Recognition, evaluation, and control of hazards
Illumination- definition, measurements and standards
5. Occupational safety
Causes of accidents, Vision, lighting color and their role
Accident Analysis, Accidents prevention
6. Ocular and visual problems of occupation
Electromagnetic radiation
Ionizing, Non- Ionizing- Infra Red, Ultra Violet, Microwave, Laser injuries- Medical Chemical
Toxicology- metals, chemicals
7. Prevention of occupational diseases
Medical examination/medical monitoring
Pre-employment/ pre- placement
Periodic
8. Personal protective equipment
General
Goggles, face shields
Selection and use

- Testing for standards
- 9. Standards
 - Visual standard for jobs
- 10. Problems of special occupational groups
 - Drivers, pilots and others
- 11. Field work- submission of reports
 - Visits to: Regional Labor Institute, Selected industries
- 12. Visual display units (terminals) VDU/VDT
 - Contact lens and work
 - Pesticides – general and visual and ocular defects

C603 Geriatric Optometry

1. **Scope and Objective-** The Optometric examination and management of senior citizens requires different approach. The purpose of this course is to provide comprehensive instructions, which will guide the students to take appropriate Visual Care of the elderly.
2. **Text and Reference Books**
 - a. Vision of the Aging Patient- Hiesch M. J & Wick RE (An Optometric Symposium), 1960
 - b. Vision and Aging- A.J. Rossenbloom Jr & M.W. Morgan, Butterworth Heinemann
 - c. Clinical Geriatric Eye Care- Sheree Aston, Joseph Maino- Butterworth Heinemann
 - d. Clinical Decision making in Optometry- Ellen Ettinger, Michael Rouse, Butterworth Heinemann

Lecture Topics

1. Structural changes in eye
2. Physiological changes in the eye
3. Optical and refractive changes in the eye
4. Aphakia- its correction
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 patients
7. Pharmacological aspects of ageing
8. Low vision causes, management and rehabilitation in geriatrics
9. Spectacle dispensing in elderly

C604 Advanced Orthoptics

1. Scope and Objective- A sound theoretical knowledge of the binocular vision paves the way for clear understanding of the physiology of the eye in the clinics. The theories of binocular vision and basics of Orthoptics included in the theory, forms the background for the student to understand binocular vision and ocular motility disorders.

2. Text and Reference Books

- a. Comprehensive review of orthoptics and ocular motility- theory, therapy, surgery- 2nd edition, Jane Hurrt, Antonia Rasicovia, Charles Windsor- CV Mosby & Co
- b. Von Noorden's Binocular Vision and Ocular Motility- Gunter K von Noorden, 2nd edition, C.V. Mosby
- c. Handbook of Orthoptic principles- G.T. Willoughby Cashell, Isobel Durran,

Lecture Topics

Diagnosis, prognosis & management methodologies

- 1) Orthoptic check-up and special instruments
 - a) Routine Orthoptic examination
 - b) Special Orthoptic investigation
 - c) Instruments used in Orthoptics
- 2) Neuro- muscular anomalies: Aetiology
- 3) Esotropia
- 4) Exotropia
- 5) Microtropia
- 6) Vertical dissociation
- 7) A& V Phenomenon
- 8) Paralytic squint
- 9) Special forms of squint – Brown's , DRS, Mobius, Strabismus fixus

C 605 Contact Lenses (II)

1. **Scope and Objective:** The subject covers all basic aspects of Contact Lenses. With a revision of Ocular Anatomy and Physiology, Visual Optics, the course will also deal with Optics of Contact Lenses, raw materials and prefitting examination.
2. **Text and Reference Books**
 - a. Contact Lenses- Dr. V.K.Dada
 - b. IACLE modules
 - c. Contact Lenses Practice- Robert B.Mandell
 - d. Contact Lenses – Stone J. and Phillips A.J. , 3rd EDITION, Butterworths,1989
- b. The Contact lens manual- Andrew Gasson- Butterworth Heinemann

- c. Corneal Physiology and disposable contact lenses- Herbert Kaufman , Hikaru Hamano, Butterworth Heinemann
- d. Anterior segment complications of contact lens wear (Second Edition)- Joel A Silbert- Butterworth Heinemann
- e. Marketing ,Managing and Contact Lenses- Robert Koetting, Butterworth Heinemann.

Lecture Topics

1. Soft Contact Lens- raw materials, classification, terminology
2. Manufacturing Soft Contact Lenses – various methods – advantages and disadvantages
3. Various designs of Soft Contact Lenses- advantages and disadvantages
4. Pre-Fitting examination- steps, significance, recording of results
5. Special points for prefitting examination of Soft Contact Lenses
6. Discussion with patient, choice of lens type
7. Fitting philosophies of Contact Lenses- methods- Trial set method
8. Fitting Soft Contact Lenses- methods- Trial set method
9. Using Trial lenses- calculations involved
10. Fitting Soft Contact Lenses- methods – first fit method
11. Methods of assessment of Soft Contact Lens fit
12. Types of fit – Steep, Flat, Optimum- on spherical cornea
13. Types of fit- Steep, Flat, Optimum- on Toric cornea with spherical lenses
14. Types of fit- Steep, Flat, Optimum- on Toric cornea with toric lenses
15. Calculation and finalizing of Soft Contact Lens parameter
16. Ordering Soft Contact Lenses- writing a prescription to the laboratory
17. Fitting Soft lenses from stock- advantages, limitations, precautions
18. Checking and verifying Soft Contact lenses
19. Components of lens care systems for soft Contact lenses
20. Contact Lens solutions- composition, necessity, advantages
21. Teaching the patient to insert and remove Soft lenses
22. Common handling instructions to first time wearers
23. Special instructions to the patient for using Soft lenses
24. Special Soft lenses- Cosmetics, Disposable , Toric
25. Special Rigid lenses and designs- Toric , Keratoconus
26. Special considerations for fitting Contact Lenses- Children, irregular cornea, Uniocular Aphakia, Sports , one eyed patients, post RK, post PRK
27. Otho- Keratology, and myopia
28. Fitting Bifocals and multi focal- RGP and Soft lenses
29. After care and followup for all Contact Lens patient
30. Patient Problems- identification, differential diagnosis and management

C-606 MEDICAL LAW AND ETHICS

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

C-607 Medical Psychology

- 1) Introduction to Psychology-
- 2) Different school of thoughts
- 3) Role of Psychological factors in Medical Illness
- 4) Social Psychology and its application
- 5) Emotions, Motivations, Learning
- 6) Memory- Types of memory, Role of visual memory
- 7) Normality and abnormality – major and minor Psychiatric entities
- 8) Biology and Psychology of perception, Emphasis on visual perception
- 9) Patient and therapists – relationship, basic principal of interview and relationship
- 10) Eye diseases- their impact on the patients and their families
- 11) Rehabilitation of the blind – Psychosocial aspects and advance perspective

DR. D.Y. PATIL UNIVERSITY

PIMPRI, PUNE – 18

Rules and Regulations

Guidelines for internship Training

Program Final Year Candidates of B.Optom (Clinical Optometry)

under the Faculty of Medicine

1. The students after successful completion the professional examinations for the Degree of Bachelor of Science in Clinical Optometry as per the syllabi prescribed by the Dr. D. Y. Patil

University, Pune for First B.Optom, Second B.Optom and Third B.Optom Final Year shall undergo 1yr months compulsory rotatory internship training programme for the Fourth and Final year to develop skill and acquire clinical knowledge with proficiency in managing patient independently.

2. These rules shall be implemented from the first batch admitted in 2008 - 09 to Optometry course. The evaluation of the interns shall be done very carefully by the In-charge, Internship Training Programme and the Head of the concerned department on the basis of the skill, knowledge and ability to handle the cases independently. The Director In-charge/Principal of the college shall have to monitor Internship Training Programme in collaboration with all Heads of the Departments. The In-charge, Internship Training Programme, Heads of the Departments and the In-charge/Off-campus Optometry In-charge of the institution shall be responsible for the maintenance of standard and records of the intern's On-Campus and Off-Campus. Any deviation/alteration in the training programme without the knowledge of the Dr. D. Y. Patil University shall not be permitted under any circumstances and the University shall not accept any responsibility in respect of any deviation/alteration in the training programme.
3. The programme of internship shall be as under:

GENERAL -

Internship is a phase of mandatory training, on full time basis, where in a candidate is expected to conduct actual Clinical Optometry practice, with fair independence in clinical decision making in low task cases where as to work under supervision at high task areas so that at the end of Internship he/ she is capable to practice Optometry profession independently.

Since Optometry profession does not have a Council to regulate the education, till such Council is formed; the Rules and Regulations recommended by the Indian Optometry Association [I.O.A.] affiliated to the World Council of Optometry (W.C.O.) and regulating body (A.S.C.O.) which is accepted by the University shall be implemented.

The Internship programme shall mainly focus on acquisition of specific skills listed in the major areas of training by “**hands on**” experience and also on ability to conduct successfully a scientific project during this period.

1. The Director In-charge/off-campus Optometry In-charge of the college/Hospital/Branded Optical Outlet shall be responsible for implementation of Internship programme and also for the issue of Internship completion certificate.
2. The Internship staff In-Charge shall be responsible for the maintenance of the standard and the records of the interns.
3. Internship shall commence **not later than One week** from the day of declaration of results of III rd yr VI semester examination.
4. It shall be binding on the candidate to follow strictly, the code of conduct prescribed by the I.O.A, A.S.C.O. and accepted by the University. Any breach in the conduct / discipline shall

disqualify the candidate from pursuing Internship for a period of One week to One month or more depending upon the gravity of breach of conduct. Stipend is recommended during the Internship.

5. Compulsory Internship shall include rotational clinical assignments, administrative skills and a scientific project over a period of 52 weeks .On successful completion of Internship, to the satisfaction of the Heads of various Dept of and the Dean/Principal of the college the Internship completion certificate shall be issued by the college and it will be forwarded to the University for the award of B.Optom (Clinical Optometry) Degree.

OBJECTIVES –

At the end of Internship programme, the candidate shall be able to-

1. Correction of Refractive errors of the Eye and Prescription for the Spectacles.
2. Thorough Detection of Ocular Diseases related to Systemic and Neurological diseases with aid and knowledge of latest Hi-tech Medical Equipments.
3. Designing and fitting of contact lenses, specialized custom lens for computers application and training and use for Low Vision Patient/AIDS and their Rehabilitation.
4. Diagnosis and Clinical Orthoptics treatment, home exercises for Oculomotor malfunctions such as heterophoria and strabismus.
5. Primary eye care services and vision screening in schools, colleges, urban slums, rural areas and occupational Optometry in industries.
6. Optometric counselling of patients with Partial sight, colour blindness and hereditary vision defects.
7. Evaluation of health status and pathological conditions of the eye and visual system and referral of patients to specialist at the appropriate stages.
8. Artificial Eyes dispensing and designing of Ocular prosthesis.

Start of Internship programme

The programme will commence within 1st week of August of the same academic year after the declaration of Final B.Optom. (Clinical Optometry) result by the University. Before commencement of the Internship Training Programme, the Principal and Internship programme staff incharge shall conduct one day Orientation programme to orient the internees to get acquainted with the details of Internship Training Programme. The Orientation programme shall cover in brief topics like Log book and recording of details, Research and Project methodology, Hands-on clinical practice, Medico-legal issues, Rehabilitation of patients, Mandatory Skills to be acquired, Social and ethical aspects, Patient Management. It shall be mandatory for the internees to attend the Orientation programme. The period of one day will taken as separate training day in the period of 1 Year Internship.

INTERNSHIP SCHEDULE -

Candidate shall be posted to five Rotational Clinical assignments of total 52 weeks, including administrative skills pertaining to Optometry practice.

Total Internship Hours: - 2028 hrs

Placement	Indoor / Outdoor	Total Hrs.
1] Refraction and history taking]	-8 weeks	
a) General work-up and history taking	48 hrs (1wk)	384hrs
b) Wet and Dry Retinoscopy	336 hrs (7wk)	
2] Contact Lens and Specialized Advance Fittings	----8 weeks	
a) Work-up and instrumentation	48 hrs (1wk)	
b) Soft contact lens Fittings	144hrs (3wk)	384hrs
c) Rigid gas permeable lens fittings	144hrs (3wks)	
d) Specialized Contact lens fittings	48hrs (1wk)	
3] Orthoptics and Binocular Vision	----- 8 weeks	
a) Preliminary Examination and Work-up	96hrs (2wk)	
b) Synaptophore and other instruments	144hrs (3wks)	384hrs
c) Amblyopia & Anti-suppression therapy	144hrs (3wks)	
4] Low Vision Subjects and Aids	----- 4weeks	
a) Low vision work-up and history training	48hrs	
b) Assessment and Hands on Training	96hrs (2wks)	192hrs
5] Anterior Segment Examination and Diseases	----- 8 weeks	
a) Preliminary Examination, Work-up, History	96hrs (2wk)	
b) Slit lamp and other instruments	144hrs (3wks)	384hrs
c) Cornea, Conjunctiva, Anterior Posterior segment diseases	144hrs (3wks)	

[Includes Project on evidence based investigation measures or Clinical trials/
Prospective case studies having sample size of minimum 100 Subjects.]

SCIENTIFIC PROJECT-

During the Internship, candidate shall undertake a scientific project of 12 weeks [total duration not less than 576 hours]. Selection of topic and place for the conduct shall be in consultation and with consent of the director /H.O.D. of the dept/Off-campus internship in-charge and the ethical committee of institution. Scientific inquiry shall be based on Comparative diagnostic or clinical trials, having a sample size of not less than 100. The candidate shall submit the project 2 months before the completion of the 1 internship periods. The Director In-charge of institution shall sign on the same if the project is up to her /his satisfaction. If found unsatisfactory, a grace period of 4 weeks shall be granted for resubmission of the project.

EVALUATION OF THE INTERNSHIP

During the rotational posting, student shall treat not less than 10 patients per day and also undertake skills of maintaining administrative records and maintenance of equipment. The candidate shall maintain a standard log book provided and record all the events of the respective posting. He/She shall be closely monitored by the senior Qualified Optometry staff or in-charge of respective through out the posting and the same shall also sign in the Log book on completion of the assignment.

1] ATTENDANCE-The student shall put up not less than 90% attendance during EACH assignment. Student's performance shall be graded by the respective clinic section In-charge at the end of each assignment. The candidates shall repeat the particular assignment if the performance is found unsatisfactory [Grades - as per directives for BPT course]

2] PROJECT- submitted by the candidate will be duly verified and a viva shall be conducted on the same at the end of the Internship. Candidate shall present the project in front of senior Faculty and if found satisfactory, the evaluators shall offer an appropriate Grade in consultation with each other. Such grade shall appear on the transcript along with the recommendation for extra credits for higher education. [Grades & Marks - as per directives for B.Optom. (Clinical Optometry Course)]

Internship Completion certificate shall be issued to the candidate ONLY after the satisfactory performance in project Viva as well as in the "Attitude" during EACH clinical assignment.

There shall be Objective skills & Subjective social assessment at the end of each of 2 postings given in schedule and score will be given to each by the panel of minimum 3 teachers involved in supervision of the student during the respective assignment. Student shall repeat the respective assignment for a period of 25% of the period allotted to the respective postings if he /she fail to score minimum 3 in the average of over all Clinical Objective skills & Subjective social score obtained during the posting.

During the Internship, student MUST CONDUCT following procedures---

A) **I] Refraction and Final ACCEPTANCE Subjective refraction and other tests**-Trail sets components uses and application, JCC Test, Stenopic slit and pin-hole uses and application of contrast sensitivity and color vision tests, Stereo-Acuity and Brightness acuity Tests, Macular function and other specialized tests

II] Objective Refraction and other tests.

Retinoscopy-Wet and Dry TYPE, Direct and In-Direct Retinoscopy, Various type of Retinoscopy Techniques, Auto-refraction, Keratometer and automated devices, Perimetry, Corneal Topography assessment technique and measurements, Tonometry and various techniques, Aesthiometry etc

III] Specialized procedure-Orthoptics and Binocular Vision therapy

Fully able to apply the use of Synaptophore machine in clinics, Prism bar, Maddox Rod, Wing and IPD and RAF ruler applications, Cam Stimulator, Prisms and filters tests etc

IV] Specialized procedures-Contact lens and Contrast Sensitivity

Slit -lamp Observation Techniques, Keratometer, Burton Lamp technique, Computerized Topography, spectrometry, Tear Film Assessment tests and various fitting

techniques and methodology for Soft and RGP lens, Keratoconus fittings, Monovision C.L.Fittings, Toric C.L.Fittings and other specialized fittings

V) Specialized procedures- Low Vision Aids and Evaluation

Latest instruments in L.V.A-Optical, electro-optical and Non Optical AIDS Various Methods with Psychology for assessment and treatment with Rehabilitation Protocol and Follow-up Regimen

VI) Community Optometry and Nutrition- Vision screening & analysis and treatment in the

form Glasses and other aids for achieving National Programme of blind of VISION2020 a] Collect, analyze, interpret & present simple community and hospital based data, b] participate as a member in co-partnership in the Vision Rehabilitation work in community c] participate in the programmes in prevention & control of locally prevalent Eye disorders, d] be capable of conducting survey and employ its findings as a measures towards arriving at Ocular& systemic functional diagnosis e]Provide Nutritional & Ocular education to an all.

TO ASSIST IN PROCEDURES -

- a] Minor Eye Operations and Ocular Prosthesis and management
- b] Sports Vision and therapy.
- c] Computer vision syndrome MANAGEMENT
- d] Disaster management and Industrial Eye wear designing and Protection

EVALUATION SCHEME- Skills during Clinical Objective & Social Subjective Evaluation shall include following of all the above mentioned major subjects for clinical skills and applications for the same in various set-ups rural and urban Optometry & Ophthalmic centers alike

LEAVE FOR INTERNS -

An internee shall be entitled for maximum 12 days leave during 1 year period of internship posting. An internee will not be permitted to avail more than 2 days leave in any department. Period of leave in excess of 2 days in a department will have to be repeated in the same department. Under any circumstances this period will not be condoned by any authority.

Issue of Internship completion certificate

The Principal will issue internee, an internship completion certificate only after completion of internship training programme, satisfactorily.

These Regulations shall remain in force until the University makes regulations in this behalf.

FORMAT OF INTERNSHIP EVALUATION (For office use only)

Name: - _____ duration from _____ to _____

Assignment:- _____

OBJECTIVE (CLINICAL) EVALUATION		SUBJECTIVE (SOCIAL) EVALUATION	
MAXIMUM SCORE	5marks each	MAXIMUM SCORE	5marks each
Refraction/Subjective and Objective Tests		Accountability/Responsibility/Attitude towards Patients	
Contact lens/Specialised Lens fittings		Administrative ability/ (records / maintenance of equipment)	
Synaptophore and Orthoptics Exercises & Tx		Skills of Treatment manoeuvres	
Low vision aids & Rehabilitation		Skills of equipment handling	
Community Optometry & Vision Screening		Participation in Academic activities	
Total		Total	

1: Poor
4: Good

2: Below Average
5: Excellent

3: Average

Head of the Department

Minimum Grade required for passing – Average of overall score obtained from the respective assignment is to be considered. Minimum score for passing shall be 3 i.e. Average.

INTERNSHIP COMPLETION CERTIFICATE

B.Optom. in (Clinical Optometry) Programme

Name of the College _____

Reference. No _____

Date _____

This is to certify that Mr. /Ms/Mrs. _____

has successfully completed the Rotational Internship from _____ to _____

Details of the Internship-posting is as follows-

NO.	DEPARTMENT	PERIOD	GRADE
1	<u>Subjective refraction and other tests</u>	_____ to _____	_____
2	<u>Objective Refraction and other tests.</u>	_____ to _____	_____
3	<u>Orthoptics and Binocular Vision therapy</u>	_____ to _____	_____
4	<u>Contact lens and Contrast Sensitivity</u>	_____ to _____	_____
5.	<u>Low Vision Aids and Evaluation</u>	_____ to _____	_____
6.	<u>Community Optometry and Public Health</u>	_____ to _____	_____
7.	Extension due to absentee /Unsatisfactory performance	_____ to _____	
	at the Department _____		
8.	Project –		
	Title _____		

[Sign] _____

Principal

Proposed

List of Off-Campus Internship Training Centers

1. Sankara Nethralaya eye hospital,Kolkata
2. L.V.Prasad Eye Hospital and Bausch & Lomb School of Optometry,Hyderabad
3. L.V. Prasad Eye Hospital, Bhubhaneshwar
4. Shroff Eye hospital and Research centre,Mumbai
5. PBMA'S H.V Desai Eye Hospital,Pune
6. Dr. Shroff Charity Eye Hospital and Research,Delhi
7. Venu Eye Institute & research centre,Delhi
8. Nayantara Eye Clinic,Delhi
9. Chaudhary Eye Centre & Laser Vision
10. Lall Eye Centre, Gurgoan, Dehli
11. Narayan Nethrayala,Bangalore

12. Dr.Doctor Eye Institute, Mumbai
13. Chinmaya Prosthetics center, New Delhi
14. GKB Opticals, Delhi & Kolkata
15. Himalaya Opticals, Delhi & Kolkata
16. Surya Eye Tech, Mumbai
17. K.K.Eye Institute, Pune

We as Institute have already ***taken permission and letter of understanding*** for assigning our students for internship for optional period of 9 and 12 months which is mutually compatible and acceptable to each other with necessary requirements for students as follows.

1. Stipend during internship and Lodging and Eating facility
2. Rotation of necessary clinical postings as envisaged in our Internship programme.
3. Daily rooster and Monthly performance report and entitled Leave, with holidays.

Justification for off-campus Posting Programme for Interns

1. Better exposure for clinical and Social Subjective development
2. Student Experience rich first hand exposure to emergency conditions and latest techniques.
3. Up-gradation of Profile and professional experiences of the interns esp internship done at super specialty Optometry centers and Eye hospitals.