

SYLLABUS FOR OPTOMETRY

GENERAL LECTURES FOR ALL STUDENTS (1ST, 2ND, 3RD YEAR)

1. Hospital environment and role of student.
2. The profession & Ethics.
3. Communication with the patients.
4. Statistics and its importance.
5. Social welfare of eye patients.
6. Law and the Optometry.

THEORY SUBJECT FOR FIRST YEAR

1. HUMAN ANATOMY & PHYSIOLOGY

1. Introduction of human body, cell and various tissue of the body.
2. Embryology and development.
3. Skeletal system of Human body
4. Muscles of the body
5. Circulatory system
6. The Blood
7. The main arteries and veins of the body & lymphatic system
8. Digestive system
9. The liver
10. The Gall bladder, Pancreas & Spleen
11. Respiratory system
12. Endocrine Organs
13. Excretory System
14. Reproductive system
15. Central Nervous System
16. Brain & Cranial Nerves
17. Spinal Cord and Peripheral nerves
18. Automatic nervous system
19. The Food, Vitamins & Protein

2. OCULAR ANATOMY

1. Embryology of the eye in general
2. Orbit and its immediate relations
3. Lids and eye lid glands
4. Conjunctiva, cornea and sclera
5. Iris and ciliary body
6. Lens and Vitreous
7. Retina & Choroid
8. Ocular Muscles
9. Visual Pathways
10. Sympathetics and Parasympathetic's system
11. Vascular supply of eye
12. Lacrimal apparatus
13. Higher visual centres

3. OCULAR PATHOLOGY

1. HAEMATOLOGY

- 1.1 Blood Cells and blood collection techniques
- 1.2 Haemoglobin estimation
- 1.3 Total leucocyte count
- 1.4 Differential leucocyte count
- 1.5 Erythrocyte sedimentation rate
- 1.6 Peripheral blood film-staining, significance of a peripheral smear
- 1.7 Bleeding time, clotting time

2. CLINICAL PATHOLOGY

- 2.1 Urine Collection methods
- 2.2 Physical Examination of Urine
- 2.3 Chemical Examination of Urine
- 2.4 Microscopic Examination of Urine

3. HISTOPATHOLOGY

- 3.1 Grossing of tissue

- 3.2 Tissue processing
- 3.3 Section cutting
- 3.4 Staining-Hematoxylin & Cosin and Special Stains

4. OCULAR MICROBIOLOGY

- 1. Introduction to Microbiology & classification
- 2. Gram Positive Bacteria
- 3. Gram Negative Bacteria
- 4. Fungi-Sephorophytics and pathogenic
- 5. Virus
- 6. Aseptic Techniques
- 7. Chlayadia & Parasites.

5. OCULAR PHYSIOLOGY

- 1. General Physiology of the eye – An Introduction
- 2. Maintenance of Transparency of the Cornea
- 3. Maintenance of Transparency of the Lens
- 4. Visual Acuity and form Sense
- 5. Pupillary reflexes
- 6. Accommodation
- 7. Convergence
- 8. Intra Ocular Pressure
- 9. Night Vision
- 10. Colour Vision
- 11. Visual Fields
- 12. Extrinsic Muscles, Actions and Ocular Movements
- 13. Higher Visual Centres and righting reflexes
- 14. Electrophysiological Aspects
- 15. Conjugate and disjuate – Movement of the eye.

6. OCULAR BIOCHEMISTRY

- 1. Introduction to various biochemical test
- 2. General Introduction to metabolic processes affecting the eye
- 3. Rhodopsin Cycle
- 4. Aqueous and vitreous humours
- 5. Metabolism of lens and cornea.

7. PHYSICAL AND PHYSIOLOGICAL OPTICS

- 1. Elementary basis of light-Interference, diffraction, polarization spectrum, surface tension, viscosity
- 2. Principles of Refraction.
- 3. Physical Optics-1, Lens Shapes-Convex, Concave

4. Physical Optics-2, Thin Lens equation, thick lens equation
5. Physical Optics-3, Front and back vertex power
6. Physical Optics-4, Aberrations
7. Physical Optics, Spherical, Cylindrical & Toric surfaces, Aspheric surfaces
8. Prisms-definition, uses nomenclature, apex
9. Determination of focal length & dioptric power of lens
10. Strum's Conoid
11. Neutralization of lenses
12. Focimeter
13. Centre & axis Marking by focimeter
14. Simple & Toric transposition
15. Prismatic effect & Decentration
16. Abberations & Tints in spectacle Lenses
17. Spectacle Lens Manufacturing – Sphericals, Toric, Biofocals, Lenticulture & Lab Visit
18. Spectacle Frames –History, Nomenclature, Types & parts, sides, joints, frame bridge.
19. Shape of Spectacle Frame –Measurements & Making, Frame & Face Measurements
20. Schematic eye
21. Emmetropia & Ammetropia – Aetiology, Population, Distribution, Growth of eye
22. Myopia
23. Hypermetropia
24. Astigmatism
25. Aphakia/Pseudo-Phakia

PRACTICAL SUBJECT FOR FIRST YEAR

1. HUMAN ANATOMY & PHYSIOLOGY

1. Introduction of human body, cell and various tissue of the body.
2. Embryology and development.
3. Skeletal system of Human body
4. Muscles of the body
5. Circulatory system
6. The Blood
7. The main arteries and veins of the body & lymphatic system
8. Digestive system
9. The liver
10. The Gall bladder, Pancreas & Spleen
11. Respiratory system
12. Endocrine Organs
13. Excretory System
14. Reproductive system
15. Central Nervous System
16. Brain & Cranial Nerves
17. Spinal Cord and Peripheral nerves
18. Automatic nervous system
19. The Food, Vitamins & Protein
20. Organs of Taste and smell

1. OCULAR PATHOLOGY

1. Sampling and Collection of Blood: intro-venous and peripheral
2. Estimation of haemoglobin
3. Peripheral Blood Film Staining
4. Identification of normal white blood cells
5. Erythrocyte sedimentation rate
6. Urine chemical examination – Sugar and Protein

2. OCULAR MICROBIOLOGY

1. Introduction to Microbiology: Culture media, Classification, Morphological, Lab diagnosis of infection.
2. Collection of Samples
3. Serology
4. Culture media for bacteria, fungi and viruses
5. Oxidase test
6. Mantoux test
7. Staining procedures: Gram Staining
8. Staining procedures: Romanowsky stains

9. Staining Procedures: Ziehl Neelsen's staining

3. ORTHOPTICS

1. Latent squint work-up
2. Synptophore
3. Maddox wings
4. Maddox bar
5. Prism bar
6. Near point of accommodation
7. Near point of convergence
8. Fusion exercises

4. OCULAR BIO-CHEMISTRY

1. Sampling and Collection of Blood
2. Biochemical tests, including blood sugar estimation
3. Ketone bodies in Urine
4. Spectrophotometry
5. Serum-Cholesterol

6. OPTICS

1. Workshop
2. Manufacturing Spectacles Lens
3. Manufacturing Bifocal Lenses.
4. Fitting Bifocals, Multifocal, Prism Lenses
5. Fitting Lenses in Frames
6. Glazing & Edging
7. Final Checking, Adjustments to prescriptions
8. Patient complaints, handling correction
9. Repair of Spectacles
10. Special types of spectacles monocells/ptosis hemianopic glasses
11. Neutralization
12. Focimeter
13. Shape of spectacle Frame- Measurements & Making, Frame & Face Measurements
14. Refraction under the supervision

THEORY SUBJECT FOR SECOND YEAR

1. OCULAR PHARMACY AND PHARMACOLOGY.

1. Ocular Pharmacology – An Introduction
2. Autonomic nervous system
3. Routes of drug administration
4. Miotics, Mydriatics & Cycloplegics drugs

5. Antibacterial drugs & therapy
6. Antifungal drugs & therapy
7. Anti-Viral drugs & therapy
8. Antibacterial drugs & Therapy
9. Anti-inflammatory drugs & therapy
10. Anti-glaucoma drugs & therapy
11. Ophthalmic dyes
12. Local Anaesthetics
13. Ophthalmic preservatives
14. Ocular lubricants
15. Ocular irrigating solutions
16. Ocular antiseptic & disinfectants
17. Contacts lens solution
18. Chelating agents
19. Immunosuppressive agents

2. REFRACTION

1. Emmetropia & Ammetropia –Aetiology, Population, Distribution, Growth of eye.
2. Myopia
3. Hypermetropia
4. Astigmatism
5. Aphakia/Pseudo-phakia
6. Presbiopia
7. Keratoconus
8. Post-Op. Refractive errors
9. Refraction of Irregular reflex
10. Accommodation & Convergence – 1. Far Point, Near Point, ranges, Amplitude of accommodation
11. Accommodation & Convergence – 2. Methods of measurements, NPA. AC/A ratio.
12. Retinoscopy –Principle & Method
13. Objective Refraction
14. Subjective Refraction
15. Cross Cylinder

3. INVESTIGATIVE OPHTHALMOLOGY

ORTHOPTICS

1. Orthoptics-General Concept
2. Ocular Muscles and movements
3. AC/A ratio
4. Measurements of angle of squint

5. Latent squint
6. Maddox rod
7. Maddox Wing
8. Synoptophore
9. Manifest concomitant
10. Paralytic Squint
11. Head Posture and its significance
12. Hess Screening and its Interpretations
13. Pleoptics
14. Occlusion –types and uses
15. Nystagmus
16. A.V. Syndromes
17. Testing of ARC
18. Amblyopia
19. Disorders of accommodation
20. Paediatric Visual acuity assessment
21. Paediatric Refraction
22. Neural aspects of binocular vision

4. OPHTHALMIC INSTRUMENTS AND APPLIANCES

1. Indirect Ophthalmoscope
2. Direct Ophthalmoscope
3. Slit Lamp: HAAG-Streit
4. Photo-slit lamp
5. Lensometer. Lens gauge
6. Tonometer
7. Fundus Camera
8. Ecternal eye Photography
9. Auto-refractometer
10. Corneal Examination -1. Placido disc
11. Corneal Examination -2. Keterometer
12. Corneal Examination -3. V KG
13. Corneal Examination -4. Specular Microscopy
14. Corneal Examination -5. Aesthesiometer
15. Exophthalmometer
16. Perimeter – Manual & Automated
17. Orthoptics Instruments- Haploscope/Home devices
18. Nerve fiber analyzer
19. Frequency doubling perimeter
20. Non Contact Tonometer
21. Heidelberg Analmascope

22. Pachometers
23. Contrast sensitivity tests
24. Glare acuity tests
25. Colour vision tests
26. Dark adaptometer

PRACTICAL SUBJECTS FOR SECOND YEAR

OCULAR PHARMACY AND PHARMACOLOGY

1. Quality Control:
 - 1.1 Sterilization
 - 1.2 pH measurement
 - 1.3 Osmolarity
 - 1.4 Spectrophotometry for concentration
2. How to prepare following eye drops:
 - 2.1 Pilo-clonidine eye drops
 - 2.2 Artificial eye drops
 - 2.3 Glycerin eye drops
 - 2.4 Homatropine eye drops
 - 2.5 EDTA eye drops
 - 2.6 Sulphacetamide eye drops
 - 2.7 Dexamethasone eye drops

- 2.8 Methylecellulose eye drops
- 2.9 Saline eye drops
- 2.10 Sodium citrate eye drops

- 3. MK Media Preparation
- 4. Autologous serum eye drops preparation
- 5. Dilution of drug in different concentration
- 6. Steroid detection test
- 2. REFRACTION**
 - 1. Refraction and prescription of glasses in OPD
- 3. INVESTIGATIVE OPHTHALMOLOGY**
 - 1. Manifest squint work-up
 - 2. Paralytic squint work-up
 - 3. Pleoptics
 - 4. Orthoptic Exercise
- 4. OPHTHALMIC INSTRUMENTS AND APPLIANCES**
 - 1. Lensometer, Lens gauge
 - 2. Tonometer
 - 3. Placido disc
 - 4. Ketherometer
 - 5. VKG
 - 6. Specular Microscopy
 - 7. Exophthalmometer
 - 8. Perimeter
 - 9. Non Contact Tonometer
 - 10. Slit Lamp: Haag-Streit
 - 11. Photo-slit lamp
 - 12. Fundus Camera
 - 13. Contrast sensitivity tests
 - 14. Glare acuity tests
 - 15. Colour vision tests
 - 16. Dark adaptometer

THEORY SUBJECT FOR THIRD YEAR

- 1. CLINICAL & ADVANCED ORTHOPTICS**
 - 1. Orthoptic-General concept
 - 2. AC/A ratio.
 - 3. Measurements of angle squint
 - 4. Latent squint
 - 5. Maddox rod
 - 6. Maddox wing
 - 7. Synoptophore

8. Manifest concomitant
9. Squint Concomitant
10. Paralytic Squint
11. Head posture and its significance
12. Hess Screening and its Interpretations
13. Pleoptics
14. Occlusion –types and uses
15. Nystagmus
16. A.V. Syndromes
17. Testing of ARC
18. Amblyopia
19. Disorders of accommodation
20. Paediatric visual acuity assessment
21. Paediatric Refraction
22. Neural aspects of binocular vision

2. CLINICAL & ADVANCED OPTICS

1. Emmetropia & Ammetropia –Aetiology, Population. Distribution, Growth of eye.
2. Myopia
3. Hypermetropia
4. Astigmatism
5. Aphakia/Pseudo-Phakia
6. Presbiopia
7. Keratoconus
8. Post-Op. Refractive errors
9. Refraction of irregular re/ex
10. Accommodation & Convergence -1. Far point, near point, range, amplitude of accommodation
11. Retinoscopy –Principle & Methods
12. Objective Refraction
13. Subjective Refraction
14. Cross Cylinder

3. CONTACT LENS

1. History of Contact Lens
2. Corneal Anatomy and Physiology
3. Corneal Physiology and Contact Lens
4. Preliminary Measurement and Investigations
5. Slit Lamp Biomicroscopy
6. Contact Lens materials
7. Optics of the Contact Lens
8. Glossary of Terms: Contact Lenses
9. Indications and Contra Indications contact Lens

10. Rigid gas permeable contact lens design
11. Soft Contact lens design & manufacture
12. Keratometry, Placido's disc, Tonography
13. Fitting philosophies
14. Fitting of Spherical SCL and Effect of parameter changes
15. Astigmatism correction options
16. Fitting Spherical RGP contact Lenses, Low OK, High OK
17. Effects of RGP contact Lenses parameter changes on lens fitting
18. Fitting in Astigmatism (Sph. RGP)
19. Follow-up post fitting examination
20. Follow-up Slit Lamp examination
21. Fitting in Keratoconus
22. Fitting in Aphakia, Pseudophakia
23. Cosmetic Contact Lenses
24. Fitting Contact Lens in children
25. Toric Contact Lenses
26. Bifocal Contact Lenses
27. Therapeutic Lenses/Bandage lenses
28. Contact lens following ocular surgeries
29. Disposable contact lenses, frequent replacement and Lenses
30. Use of Specular Microscopy and pachymetry in Contact Lenses
31. Care & maintenance of Contact Lenses
32. Contact Lens modifications of finished lenses
33. Instrumentation in Contact lens practice
34. Checking finished lenses parameters
35. Recent developments in Contact Lenses
36. Review of lenses available in India

4. CLINICAL & ADVANCED REFRACTION

1. Emmetropia & Ammetropia –Aetiology, Population. Distribution, Growth of eye.
2. Myopia
3. Hypermetropia
4. Astigmatism
5. Aphakia/Pseudo-Phakia
6. Presbiopia
7. Keratoconus
8. Post-Op. Refractive errors
9. Refraction of irregular re/ex
10. Accommodation & Convergence -1. Far point, near point, range, amplitude of accommodation
11. Retinoscopy –Principle & Methods
12. Objective Refraction
13. Subjective Refraction

14. Cross Cylinder
15. Low- Vision aids: Techniques & microscopes
16. Rehabilitation of blinds

5. EYE BANK

1. Publicity
2. How to donate your eyes
3. Preservation of eyes
4. Pre-operative Instruction
5. Post-operative Instruction
6. Latest techniques for Preservation of donor Cornea

6. COMMUNITY OPHTHALMOLOGY

1. Concepts of community Ophthalmology-I
2. Concepts of community Ophthalmology-II
3. The Epidemiology of Blindness (General Principles) – I
4. The Epidemiology of Blindness (General Principles) – II
5. The Epidemiology of Blindness (Disease specific strategies) – III
6. The Epidemiology of Blindness (Disease specific strategies) – IV
7. Survey Methodological – I
8. Survey Methodological – II
9. Survey Methodological – III
10. Screening Procedures in Ophthalmology – I
11. Screening Procedures in Ophthalmology - II
12. School eye screening programme
13. Primary eye care
14. Organization of Out reach services
15. Organization of Reach-in-programme
16. Information, Education, communication
17. Rehabilitation of the visually handicapped
18. National programme for control of Blindness-I
19. National programme for control of Blindness-I
20. Vision 2020: The Right to sight

7. INVESTIGATIONS IN CLINICAL OPHTHALMOLOGY

1. Principle, Techniques and preparation of the patient
2. ERG
3. Electro-Oculomyo-gram
4. Ultra-sono-graphy
5. Tonography
6. Berman's Locator/Foreign body locator
7. Flurescein Angiography
8. Ocular Photography –anterior segment
9. Dark Adaptometry: Adaptation & Adaptometer

10. Syringing & Lacrimal function Test
11. Gonioscopy
12. Pachometry
13. Perimetry
14. Laser Therapy
15. Contrast Sensitivity
16. Slit Lamp
17. VKG
18. Specular Microscopy
19. Fundus Photography
20. Colour Vision Investigations- Ishhara charts, E-G Lantern, Negal's anomaloscope, 100 Hue Test
21. A –Scan Biometry
22. Heidelberg Retina-tomography HRT-II
23. Nerve Fiber analyzer
24. Frequency doubling perimeter
25. Non Contact Tonometry
26. UBM
27. OCT

8. MANAGEMENT OF OT

1. Introduction to Ocular in general
2. Asepsis: How to achieve

APPENDIX – I
B.Sc Optometry Phase-I

Sl. No	Paper Theory	Subject	Theory Final	Internal Assessment	Total
1	I	Human Anatomy & Physiology	70	30	100
2	II	Ocular Anatomy, Pathology & Microbiology	70	30	100
3	III	Ocular Physiology & Biochemistry including Binocular reflexes & its maintenance	70	30	100
4	IV	Optics	70	30	100
Practical Including Viva					
6	I	Anatomy & Physiology	70	30	100
7	II	Ocular Pathology & Microbiology	70	30	100
8	III	Orthoptics	70	30	100
9	IV	Lens Grinding & fitting	70	30	100

APPENDIX – II
B.Sc Optometry Phase-II

Sl. No	Paper Theory	Subject	Theory Final	Internal Assessment	Total
1	I	Pharmacology & Pharmacy	70	30	100
2	II	Refraction (including prescription, making & fitting of glasses)	70	30	100
3	III	Investigative Ophthalmology	70	30	100
4	IV	Ophthalmic Instrument & Appliances	70	30	100
Practical Including Viva					
6	I	Pharmacology & Pharmacy	70	30	100
7	II	Refraction (including prescription, making & fitting of glasses)	70	30	100
8	III	Special investigation, including Orthoptics	70	30	100
9	IV	Appliances	70	30	100

APPENDIX – III
B.Sc Optometry Phase-II

Sl. No	Paper Theory	Subject	Theory Final	Internal Assessment	Total
1	I	Clinical & advanced Optics & Orthoptics	70	30	100
2	II	Clinical Refraction and Contact lenses	70	30	100
3	III	Community Ophthalmology and Eye Bank	70	30	100
4	IV	Investigation in Clinical Ophthalmology and management of OT	70	30	100
Practical Including Viva					
6	I	Refraction	70	30	100
7	II	Orthoptics and Pleoptics	70	30	100
8	III		70	30	100
9	IV		70	30	100