

REGULATIONS OF THE UNIVERSITY

In exercise of the powers conferred by Section 44 of the Tamil Nadu Dr.M.G.R.Medical University, Chennai Act 1987 (Tamil Nadu Act 37 of 1987) the Standing Academic Board of the Tamil Nadu Dr.M.G.R.Medical University, Chennai hereby makes the following regulations:-

1. SHORT TITLE AND COMMENCEMENT:-

These regulations shall be called as “THE REGULATIONS FOR THE M.OPTOM. OF THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY, CHENNAI”.

They shall come into force from the academic year 2012-2013 onwards.

The Regulations and the Syllabus framed are subject to modification by the Standing Academic Board from time to time.

2. OBJECTIVES: -

Optometry is a discipline concerned with

- (a) Application of physical concepts and methods to the understanding of human field vision in health and disease
- (b) Introduction of new and more precise techniques into the investigation and correction of vision treatment of the individual patient and
- (c) Ensuring the availability and use of resources of Optometry in day –to –day practice.
- (d) At the end of the course the student must have an in depth knowledge in the field of Optometry.
- (e) Have an understanding about the radiation applications in diagnosis correction of vision and treatment and its impact on health care and health care delivery.

3. ELIGIBILITY CRITERIA:-

Candidates who have passed B.Sc. ,(Optometry) degree of this University or any other University recognized as equivalent thereto by the authority of this University.

4. ELIGIBILITY CERTIFICATE:

Candidates who have passed any qualifying examination, as specified in Regulation No.3 above from any other Universities other than the Tamil Nadu Dr.M.G.R. Medical University before seeking admission to the affiliated institutions shall obtain an Eligibility Certificate from the University by remitting the prescribed fees along with the application form which shall be downloaded from the University website (www.tnmgrmu.ac.in).

5. DURATION OF THE COURSE:- Two years

Each academic year shall consist of not less than 270 working days.

Total No. of days in a year		365 days
No. of weekly off(Sundays) -	52 days	
No. of Government Holidays -	22 days	
No. of Holidays -	21 days	
	-----	95 days

Total No. of working days including examination period		270 days

6. AGE LIMIT FOR ADMISSION :-

40 years. For SC/ST candidates age relaxation is for 5 years.

7. PHYSICAL FITNESS CERTIFICATE:

Every candidate before admission to the course shall submit to the Director of the Institution a certificate of medical fitness from an authorized medical officer that the candidate is physically fit and mentally sound to undergo the academic course and does not suffer from any disability or contagious disease.

8. CUT OFF DATES FOR ADMISSION TO THE COURSE

Candidates admitted up to **30th September** shall be registered to take up their first year examination from October / April of the next year, after fulfilment of the regulations.

All kinds of admissions shall be completed on or before **30th September** of the academic year. There shall not be any admissions after **30th September**, even if seats are vacant.

* It was resolved 48th S.A.B. Dated 02.07.2014

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9. REGISTRATION:

A candidate admitted to the Post Graduate Degree in Optometry shall register his/ her name by submitting the prescribed application form for registration duly filled in by remitting the prescribed fee to the Tamil Nadu Dr. M.G.R. Medical University within 30 days from the cut off date prescribed for Post Graduate Degree in Optometry.

10. COMMENCEMENT OF THE COURSE:

1st September

• It was resolved 48th S.A.B. Dated 02.07.2014

11. MIGRATION/TRANSFER OF CANDIDATES

Request for Migration/Transfer of candidates during the course of study from one recognized Institution to another recognized Institution of this University or from other University shall not be granted under any circumstances.

12. RE-ADMISSION AFTER BREAK OF STUDY

As per the procedure laid down in a common regulation for all the courses of the Tamil Nadu Dr. M.G.R. Medical University.

13. POSTING AND TRAINING IN OUTSIDE CENTRES:

It is mandatory the M.Optom. student should undergo fifteen days of posting in each Speciality Departments like Contact Lenses, Cornea, Paediatric, Ophthalmology, Glaucoma, Low Vision and Retina (3 months).

14. MAINTENANCE OF LOG BOOK:-

- a) Every Post Graduate Degree candidate shall maintain a record of skills (Log Book) he / she has acquired during the two years training period, certified by the various Heads of Department, where he / she undergone training including outside the institution.
- b) The candidate should also be required to participate in the teaching and training programme of post-graduate and intern-students.
- c) In addition, the Head of the Department shall involve their Post-graduate Degree course candidates in Seminars, Journal Clubs, Group Discussions and participation in clinical.
- d) Every Post- graduate Degree course candidate should be encouraged to present short title papers in conferences and improve on it and submit them for publication in reputed medical journals. Motivation by the Heads of Departments is essential in this area to sharpen the research skills of the post-graduate candidates.
- e) The Head of the Department shall scrutinize the Log Book once in every three months.
- f) At the end of the course, the candidate should summaries the contents and get the Log Book certified by the Head of the Department.
- g) The Log Book for each years should be submitted 3 months prior to the final year examinations.

15. DISSERTATION & EVALUATION:-

The topic of the dissertation should be submitted at the end of the first year of the course. The candidate should also inform the name of the guide for the dissertation to the University while submitting the dissertations topic.

If there are changes in the dissertation topic, the same has to be informed six months prior to the final year examination.

The dissertation should be submitted duly signed by the Professor of Ophthalmology and the same has to be forwarded to the Controller of Examination through the Head of the Institution two months prior to the Examination.

For dissertation marks 200, Viva-voce on dissertation/Presentation mark 50 and IA 50– Minimum mark to pass 150.

* It was resolved XXXX111 S.A.B. Dated 19.12.2011.

If the dissertation is not approved (Failed) by the majority of the examiners, the results shall be withheld till the resubmitted dissertation is approved (Passed).

If the candidate fails in the Written / Practical Examination, but his / her dissertation is approved(Passed), the approval of the dissertation shall be carried over to the subsequent examination.

16. ATTENDANCE REQUIREMENT FOR ADMISSION TO EXAMINATION

- a) No candidate shall be permitted to appear in any one of the parts of M.Optom.

Course Examinations, unless he / she has attended the course in all the subjects for the prescribed period in an affiliated Institution recognized by this U n i v e r s i t y a n d h a s t o p r o d u c e t h e necessary certificates of study, attendance, satisfactory conduct and progress from the Head of the Institution.

- b) A candidate is required to put in a minimum of 85% of attendance (of 270 days) each in theory and practical classes in each subject before admission to the examination.
- c) A candidate lacking in the prescribed attendance and progress in any one subject in theory and practical classes, wherever necessary in the first appearance, shall not be permitted for admission to the entire examination.

17. CONDONATION OF LACK OF ATTENDANCE:

There shall be no condonation of lack of attendance in Post Graduate degree programme.

18. COMMENCEMENT OF EXAMINATION:

15th October / 15th April

If the date of commencement of examinations falls on Saturdays / Sundays or declared Public Holidays, the examination shall begin on the next working day.

19. MEDIUM OF INSTRUCTION:

English shall be the medium of instruction for all the subjects of study and examination of the Post - graduate Degree in Optometry.

20. AWARD OF DEGREE :-

The degree shall be awarded by the University only after the successful completion of the course.

21. AWARD OF MEDALS / PRIZES:-

The University shall award at its Convocation, medals and prizes to outstanding candidates as and when instituted by the Donors as per the schedule prescribed for the award.

22. PASSING MINIMUM:

A candidate shall be declared to have passed in each paper/subject if he / she secures NOT LESS THAN 50% of the marks prescribed for the examinations.

23. REVALUATION / RETOTALLING OF ANSWER PAPERS:-

Re-totalling / Revaluation of answer paper is not permitted.

24. NUMBER OF APPEARANCE/COMPLETION OF THE COURSE OF STUDY

The duration for completion of the course is double the duration of the course i.e. 4 years to pass the examination, from the date of joining the course. Otherwise he / she has to be discharged from the course.

24. CURRICULUM:- FIRST YEAR:

Paper - I	Optometry-I
Paper - II	Optometry in Special Need Group – LVA
Paper - III	Orthoptics
Paper - IV	Contact Lens-I
Paper - V	Optometric Instruments
Paper - VI	Ocular Diseases-I
Paper - VII	Optometric Investigation

SECOND YEAR:

Paper - I	Optometry-II
Paper - II	Evidence based Optometry
Paper - III	Advanced Orthoptics
Paper - IV	Ocular Diseases II
Paper - V	Contact Lens-II
Paper - VI	Community Optometry
Paper - VII	Applied & Clinical Optometry
Paper - VIII	Systemic Diseases and the eye

Dissertation is to be submitted three months before the final year examination.

25. INTERNAL ASSESSMENT:

The Internal Assessment should consist of the following points for Evaluation:-

INTERNAL ASSESSMENT – SCHEME : 50 MARKS

Theory	Practical	Log Book
20 marks	20 marks	10 marks

The Internal Assessment of the candidate has to be assessed on the above points and a report has to be submitted by the institution as detailed below:-

The aggregate of Final Internal Assessment Marks should be submitted 2 months before the commencement of the exam as per scheme of examination shall be taken by the University as Internal Assessment Marks and minimum of 50% marks is mandatory for permitting the candidates to sit for the University examinations.

26. SCHEME OF EXAMINATION:

FIRST YEAR

S.No	Subjects	Internal Assessment (IA)		Theory		Practical		Viva Voice	
		Max	Min	Max	Min	Max	Min	Max	Min
1.	Optometry-I	50	25	100	50	100	50	-	-
2.	Optometry in Special Need Group – LVA	50	25	100	50	-	-	-	-
3.	Orthoptics	50	25	100	50	100	50	-	-
4.	Contact Lens-I	50	25	100	50	-	-	-	-
5.	Optometric Instruments	50	25	100	50	100	50	-	-
6.	Ocular Diseases-I	50	25	100	50	-	-	-	-
7.	Optometric Investigation	50	25	100	50	-	-	-	-

SECOND YEAR

S.No	Subjects	Internal Assessment (IA)		Theory		Practical		Viva Voice	
		Max	Min	Max	Min	Max	Min	Max	Min
1.	Optometry-II	50	25	100	50	-	-	-	-
2.	Evidence based Optometry	50	25	100	50	100	50	-	-
3.	Advanced Orthoptics	50	25	100	50	100	50	-	-
4.	Ocular Diseases II	50	25	100	50	-	-	-	-
5.	Contact Lens-II	50	25	100	50	100	50	-	-
6.	Community Optometry	50	25	100	50	-	-	-	-
7.	Applied & Clinical Optometry	50	25	100	50				
8.	Systemic Diseases and the eye	50	25	100	50				

If a candidate fails in practical (or) theory he/she has to write BOTH the practical paper and the RELATED theory subject.

Evaluation of Dissertation	200
Viva/Presentation	50
IA	50
Total	300
Passing Minimum	150

* It was resolved XXXX111 S.A.B. Dated 19.12.2011.

The candidates having arrear papers should complete and pass the first year papers before appearing for the final year examinations.

27. AUTHORITY TO ISSUE TRANSCRIPT :-

The Controller of Examinations shall be the authority for issuing transcript of marks after remitting the prescribed fee.

28. SUBMISSION OF PRACTICAL RECORD BOOKS :-

At the time of Practical Examination, each candidate shall submit to the Examiners his / her Practical Record Books duly certified by the Head of the Department as a bonafide record of the work done by the candidate.

The concerned Head of the Department shall evaluate the Practical Record (Internal Assessment) and the Practical Record shall be presented to the Examiner at the time of examinations at the end of each year.

29. QUESTION PAPER PATTERN:-

Theory

Essay - 2 x 20 Marks = 40 Marks

Short Notes - 10 x 6 Marks = 60 Marks

100 Marks

Requirement for pass: 50% in each paper

SYLLABUS FOR M.OPTOM. COURSE

FIRST YEAR

PAPER I

OPTICS A OPTOMETRY I

1. NATURE OF LIGHT:

- a) Wave nature of light – shortcomings 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 a straight line and at right angles.
- d) Huygen's Principle – Laws of reflection and refraction at spherical surfaces and lenses.
- e) The paraxial region.
- f) Ray and wave velocity.

2. INTERFERENCE:

- a) Description of the phenomena – Young's experiments, coherent sources, phase and path difference, and intensity. Theory of interference fringes.
- b) Interference in thin films – interference due to reflected and transmitted light – eye's single mirror.
- c) Colours of thin films – wedge shaped thin films – testing of plainness of surface.
- d) Newton's rings experiment – refractive index of liquid.
- e) Non-reflecting films.
- f) Visibility of fringes.

3. DIFFRACTION:

- a) Single slit, qualitative and quantitative.
- b) Circular aperture
- c) Double slit pattern
- d) Multiple slit grating
- e) Reflection grating and the zone plate.

4. POLARISATION:

- a) Polarization of transverse waves – light as transverse waves.
- b) Double refraction, principal planes, Nicol prism – plane polarization
- c) Circular, elliptic polarization production, detection and behaviour.
- d) Optical activity – Fresnel's half shade polarimeter.
- e) Polarisation by selective absorption – dichroism.
- f) Basic principles of Holography.

5. SPECTRUM:

- a) Sources of spectrum, Bunsen – carbon – mercury - sodium
- b) Emission and absorption spectra – classification – visible – ultra violet and infra red spectra – electromagnetic spectrum.

6. SCATTERING:

- a) Rayleigh's scattering
- b) Raman scattering

7. SURFACE TENSION

8. VISCOSITY

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 – Utilization factor, depreciation factor
- 7. Illumination laws
- 8. Lighting installation – glare, luminaires, lighting fixtures, types of lighting.
- 9. Requirements for illuminations of work place
- 10. Typical lighting installations
- 11. Specialized aspects of illumination, endoscopes, headlamps etc.
- 12. Photometry – measurement of illumination, photometers and filters.
- 13. Eye care and lighting – special case.

Text and reference Books:

- a) Geometrical, Physical and Visual Optics – Micheale Keating Butterworth Heinemann.
- b) A Textbook of Optics N.SUBRAMANYAM & BRIJLAL
- c) Fundamental of Optics : F.A. JENKINS & H.E. WHITE

OPTICS B

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 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 point imaging examples, lateral magnification.
- c. Thin lens equation – lenses in contact separated. Two lens systems – reduced systems using vergence techniques.
- d. Application – calculation of image points, dioptric powers in reduced systems using vergence techniques.
- e. 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, dioptric powers using reduced systems. Matrix theory and lens matrices.

3. Aberrations:

- a. Chromatic aberrations – dispersion without deviation and deviation with dispersion.
- b. Dispersion by a prism – angular dispersion – dispersion power – dispersion without deviation and deviation without dispersion.
Achromatic prisms and lenses – prism diopters.

- c. Monochromatic aberrations – first order and third order theory.
- d. Spherical aberrations, coma, astigmatism, curvature, distortion – cause 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. Colour theories** – trichromatic colour measurement.
- 6. Optical instruments** – spectrometer – simple and compound microscope – telescope.
Fresnel's biprism – Resolving power of optical instruments – Dispersion power – magnifying power of simple and compound microscope, t telescope.
- 7. Applications 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. Refraction, 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 apertures in lens systems.
- 17. Thick lenses and lens systems
- 18. Thick lenses – advances

19. Dispersion Spectra 20. Magnification

and magnifiers. 21. Microscopes

introductory 22. Microscopes design

23. Telescopes – History and principles

24. Telescopes – Design and uses

25. Holograms

Text and reference Books

a. Geometrical, Physical and Visual Optics – Micheale Keating Butterworth Heinemann

b. A Text Book of Optics : N. Subramaniam & Brij Lal

c. Fundamentals of Optics : F.A. Jenkins & H. E. White

d. Physics for Ophthalmologist – Douglas J. Coster

OPTICS C

Ophthalmic Lenses Theory Basics (i)

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 & image formation through convex and concave lenses.

10. Determination of focal length and dioptric power of iris. 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 and sag formula
19. Focimeter – power of lens and prisms
20. Center marking & Axis marking by focimeter.
21. Simple Transposition.
22. Toric transposition.
23. Prismatic effect, Centeration. 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 spectacles prescription.
29. Prescription mistakes commonly made.
30. Prismatic effect of sphero-cylindrical lenses.
31. Aberrations in Ophthalmic lenses
32. Tilt induced power in spectacles 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 material – 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 Aspherical
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

Spectacles Frames – theory basics (1)

1. History of spectacles

2. Nomenclature and terminology

3. Types and Parts of spectacle frames

4. Spectacles frames – sides and joints

5. Spectacle frame bridge

6. Shapes of spectacle frames – advantages and disadvantages

7. Spectacle frame measurements and markings.

Text and reference Books

a) Spectacle Lenses – Theory and practice – Coling Fowler, Butterworth Heinemann.

b) Ophthalmic Lenses and dispensing – M.Jalie, Butterworth Heinemann.

c) Spectacles Lenses – Theory & Practice – Colin Fowler, Keziah Latham

d) Ophthalmic Lenses and Dispensing – M.Jalie

PAPER – II OPTOMETRY IN SPECIAL NEED GROUP

– LVA

Unit-I

1. a. Correction of spherical ametropia
 - b. Axial versus refractive ametropia
 - c. Ocular refraction versus spectacle refraction
 - d. Ocular accommodation versus spectacle accommodation
 - e. Rational 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 ophthalmic phakometry
 - d. Axial and axis of the eye
 - e. Far and Near Point of Accommodation

- f. Subjective Methods of refractions
- g. Objective Methods of refraction
- h. Guideline for correction of refractive error
- i. Patient Management

Unit-II

Optics Practical Demonstrations

1. Visual acuity, stereo acuity in emmetropia
2. Myopia and pseudomyopia, myopia and visual acuity
3. Myopic correction-subjective verification and monocular and binocular
4. Hypermetropia – determination of manifest error subjectively
5. Hypermetropio 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-cyl. Subjective verification tests.
9. Measurement of accommodation: near and far points and range 10.Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid cylinder 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.

Unit-III: Low Vision Aids

1. Identifying a low vision patient
2. History
3. Refraction
4. Evaluation of near vision Amsler grid and the field 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 of functional vision
11. Light, glare and contrast in low vision care rehabilitation
12. Diagnostic procedures in low vision care management
13. Optics of low vision aids
14. Biotopic telescopes
15. Optical devices that help people with field defects

Text Book & Reference Books

- a. Practice of Refraction – Duke Elders, Edn. 9, 1991
- b. Optics & Refraction – A.K. Khurana
- c. Clinical Optics – Budd Appleton
- d. Low Vision Aids – Monika Chaudhry

PAPER – III - ORTHOPTICS

Investigation of Normal Binocular Function and Vision

1. History & Observation
2. Cover Test & Assessment of Ocular Motility to include all systems
3. Assessment of Vision: Methodology; Selection of tests; Modification of Testing in relation to Amblyopia; Investigation of non-organic Vision Loss
4. Accommodation / Convergence: Types of Convergence; Accommodative Lead & Lag; Relative Convergence & Accommodation; AC/A & CA/C Ratios; Classification of Convergence & Accommodation Anomalies; Management of Convergence & Accommodation Anomalies; Relevance to Strabismus
5. Assessment of Fusion: Motor Fusion; Relative Fusional Vergences; Methodology; Normative Values; Significance of Defective Fusion
6. Assessment of Stereopsis: Types of Stereotests; Application to Age Group & Quality of BSV

Amblyopia

1. Development
2. Classification
3. Investigation
4. Factors influencing prognosis
5. Optical, Pharmacological & Orthoptic Management

Concomitant Strabismus

Heterophoria

1. Associated / dissociated Heterophoria
2. Classification
3. Investigation
4. Indications for Treatment
5. Optical, Orthoptic & Surgical Management

Heterotropia

1. Classification of Esotropia: Microtropia; Infantile (to include DVD) Nystagmus Blockage Syndrome; Acquired Constant Esotropia; Intermittent Esotropia: Near; Distance & Non-specific; Accommodative Esotropia: Fully Accommodative; Convergence Excess; Partially Accommodative Esotropia; Cyclic Esotropia; Secondary Esotropia; Consecutive Esotropia
2. Classification of Exotropia: Infantile Exotropia; Constant Acquired Exotropia; Intermittent Exotropia: Near; Distance; Secondary Exotropia; Consecutive Exotropia; Associated Vertical Deviations
3. Clinical Characteristics & Differential Diagnoses of Esotropias & Exotropias
4. Assessment of Binocular Function in Heterotropia and Significance of Findings
5. Associated Alphabetical Patterns and Influence on Findings
6. Optical, Orthoptic & Surgical Management of Heterotropia, including Timing of Intervention

Infranuclear Deviations

1. Functions of EOM: Primary, Secondary & Tertiary actions; OM systems
2. Examination of EOM function & systems; Examination of versions / ductions; Hess / Lees screens; Field of BSV; Field of Uniocular Fixation
3. Muscle sequelae; Differential Diagnosis of Neurogenic / Mechanical Palsies

Neurogenic Palsies

1. Aetiology of Cranial Nerve Palsies
2. Diagnosis & Characteristics of IIN Palsy; Partial / Complete IIN palsy; Differential Diagnosis of Congenital/ Acquired IIN Palsy; Misdirection Syndrome; Management of IIN Palsy
3. Characteristics & Diagnosis of IVN Palsy; Differential Diagnosis of Congenital / Acquired IVN Palsy; Bielschowsky Head Tilting Test; Park's Three Step Test; Management of IVN Palsy
4. Characteristics & Diagnosis of VIN Palsy; Differential Diagnosis Congenital / Acquired VIN Palsy; Differential Diagnosis of Congenital VIN Palsy & Duane's Retraction Syndrome; Management of Management of VIN Palsy

Mechanical Palsies

1. Aetiology, Clinical Characteristics & Diagnosis of Duane's Retraction Syndrome
2. Aetiology, Clinical Characteristics & Diagnosis of Brown's Syndrome
3. Aetiology, Clinical Characteristics & Diagnosis of General Fibrosis Syndrome; Strabismus Fixus; Adherence Syndrome
4. Aetiology, Clinical Characteristics & Diagnosis of Blow-out Fractures
5. Aetiology, Clinical Characteristics & Diagnosis of Thyroid Eye Disease
6. Management of Mechanical Deviations

Internuclear Palsy

1. Aetiology, Clinical Characteristics & Diagnosis of Internuclear Palsies; Unilateral / Bilateral INO;
2. Management of INO

Supranuclear Palsy

1. Aetiology, Clinical Characteristics & Diagnosis of Supranuclear Palsies;
2. Management of Supranuclear Palsies

Nystagmus

1. Classification
2. Investigation;
3. Significance in Strabismus; Significance in Assessment of VA & Refraction
4. Management of Nystagmus

Anomalies of Binocular Vision in Congenital Syndromes

To include: Marcus Gunn Jaw-Winking phenomenon; Down's Syndrome; Cerebral Palsy; Craniofacial Anomalies

Reference Books:

1. Pediatric ophthalmology & Strabismus, Basic & Clinical Science course, American Academy of Ophthalmology
2. Pediatric Ophthalmology & Strabismus, Kenneth. W. Wright, Mosby Publishers, St. Louis, MO 63146
3. Pediatric Optometry, Jerome Rosner, Butterworth Publishers, Houston, Texas.
4. Clinical Management of Binocular Vision: Heterophoric, Accommodative and Eye movement disorders, Mitchell Scheiman & Bruce Wick, Lippincott Williams & Wilkins.
5. Diagnosis and Management of Ocular Motility Disorders
Ansons and Davis. 3rd Edition. (Blackwell Science)
6. Clinical Orthoptics. Fiona Rowe. 2nd Edition. (Blackwell Science)

7. Binocular Vision and Ocular Motility. Theory and Management of Strabismus. G.K. Von Noorden and E.C. Campos. 6th Edition. (Mosby)
8. The Neuro-Ophthalmology Survival Guide. Anthony Pane, Michael Burdon and Neil R Miller. Mosby Elsevier.

PAPER – IV - CONTACT LENS I

Unit-I

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 Cornea; topography
13. Slit Lamp examination
14. Discussion with patient, choice of lens type

Unit-II

1. Fitting philosophies of contact Lenses – general outline
2. Fitting Rigid Contact lenses
3. Using trial lenses – calculations involved
4. Methods of assessment of Contact Lens fit.
5. Types of fit – Steep, Flat, Optimum – on spherical cornea.
6. Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses
7. Types of fit – Steep, Flat, Optimum – on Toric cornea with toric lenses

Unit-III

1. Calculation and finalizing of Contact Lens parameters
2. Ordering Rigid verifying Contact Lens – writing a prescription to the Laboratory.
3. Checking and verifying Contact Lens from Laboratory
4. Modifications possible with Rigid lenses
5. Components of Lens Care systems for Rigid lenses
6. Contact lens solutions- composition necessity advantages.
7. Teaching the patient to insert and remove Rigid lenses.
8. Common handling instructions to first time wearers
9. Special instructions to the patient wearing Rigid Gas Permeable Contact Lenses.

Text and reference books

- a. Contact Lenses – Dr. V.K. Dada
- b. Contact Lenses Practice – MONTAGUE RUBEN

PAPER – V - OPTOMETRIC INSTRUMENTS

Lecture Topics

Unit-I

1. Binocular Vision

Unit-II

1. Refractive Instruments

- a. Test charts standards
- b. Choice of test charts
- c. Trial case lenses
- d. Refractor (phoropter) head units
- e. Optical considerations of refractor units
- f. Trial frame design
- g. Near vision difficulties with units and trial frames
- h. Retinoscope – types available
- i. Adjustment of Retinoscope – special features
- j. Cylinder retinoscopy

- k. Objective optometers
- l. Coincidence optometers-principals and details
- m. Infrared optometer devices
- n. The interpretation of objective findings
- o. Speacial subjective test polarizing and displacement etc.
- p. Projection charts
- q. Illumination of the consulting room
- r. Time and motion study in refraction
- s. Furniture and accessories in the practice
- t. Instruments of the future

Unit-III

1. Ophthalmoscopes and related devices

- a. Design of ophthamoscopes- illumination
 - b. Design of ophthamoscopes- viewing
 - c. Ophthamoscopes disc
 - d. Filters for ophthamoscopes
 - e. Indirect ophthamoscopes
 - f. The use of ophthamoscopes in special cases.
2. Lensometer, lens gauge or clock

Unit-IV

1. Slit Lamp

- a. Slit lamp systems
- b. Viewing microscope systems
- c. Slit lamps in production
- d. Slit lamp accessories
- e. Slit lamp techniques
- f. Slit lamp appearances
- g. Mechanical design instruments

2. Tonometer

- a. Tonometer principles
- b. Types of tonometers and standardization
- c. Use and interpretation of tonometers

3. Fundus Camera

- a. The fundus camera - principles
- b. The fundus camera – techniques

4. External eye photography - apparatus.

- a. External eye photography - techniques

5. Corneal examination

- a. Placidos Disc.
- b. Keratometer
- c. Video Keratoscopy
- d. Corneal Topography
- e. Specular Microscope
- f. Aesthesiometer
- g. Pachymetry

6. Exophthalmometer

7. Refractionometer

8. Orthoptic Instruments

- a. Orthoptic instruments - haploscopes
- b. Orthoptic instruments – home devices
- c. Orthoptic instruments – pleoptics
- d. Historical instruments

Unit-V

1. Colour vision testing devices

2. Field of vision and screening devices.

- a. Perimeter and visual field
- b. Campimeters and fixation devices
- c. Illumination of field testing instruments
- d. Projection perimeters and Campimeters
- e. Screening devices for field defects
- f. Results of field examination
- g. Vision screeners – principles
- h. Vision screeners – details
- i. Analysis of screener results

3. OCT

Text and reference Books

- a. Basic Ophthalmology - Renu Jogi 3rd Ed.,
Jaypee published
- b. Parson's Diseases of the eye – Ramanjit Sihota. Radhika Tandon 20th Ed. Elsevier
Pvt. Ltd.
- c. Low Vision Aids – Monica Chaudhry 2006 Jaypee published
- d. Practical Manual of Ophthalmology – Vinod Lohiya 2006, Jaypee published

- e. Basic Ophthalmology – Basak

PAPER – VI - OCULAR DISEASES – I

Lecture Topics

Unit-I: Eyelids

1. Eyelid anatomy
2. Congenital and developmental anomalies
3. Blepharospasm
4. Ectropion
5. Entropion
6. Trichiasis and symblepharon
7. Eyelid inflammations
8. Eyelid tumors
9. Ptosis
10. Eyelid retraction
11. Eyelid trauma

Lacrimal System

1. Lacrimal anatomy
2. Lacrimal pump
3. Methods of lacrimal evaluation
4. Congenital and development anomalies of the lacrimal system
5. Lacrimal

obstruction

6. Lacrimal sac tumors

1. Lacrimal trauma

Unit-II: Sclera, Episclera

1. Ectasis and staphyloma

2. Scleritis and episcleritis

Orbit

1. Orbital anatomy

2. Incidence of orbital abnormalities

3. Methods of orbital examination

4. Congenital and developmental anomalies of the orbit

5. Orbital tumors

6. Orbital inflammation

7. Sinus disorders affecting the orbit

8. Orbital trauma

Unit-III: Conjunctiva and Cornea

a. Inflammation

b. 1. Therapeutic principles,

2. Specific inflammatory diseases

c. Tumors

1. Tumors of epithelial origin

2. Glandular and adenexa tumors

3. Tumors of neuroectodermal origin

4. Vascular Tumors

5. Xanthomatous origin

6. Inflammatory tumors

7. Metastatic lesions

d. Degeneration and dystrophies

1. Definition

2. Degeneration's

3. Dystrophies

- e. Miscellaneous conditions
 - 1. Keratoconjunctivitis Sicca (K-Sicca)
 - 2. Tear function tests
 - 3. Steven Johnson syndrome
 - 4. Ocular Rosacea
 - 5. Atopic eye disorders
 - 6. Benign mucosal pemphigoid (BMP)-ocular pemphigoid
 - 7. Vitamin A deficiency
 - 8. Metabolic diseases associated with corneal changes

Unit-IV: IRIS, Ciliary Body and Pupil

- a. Congenital anomalies
- b. Primary and secondary disease of the iris and ciliary body
- c. Tumors
- d. Anomalies of pupillary reaction

Choroid

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

Text and reference books

- a. Parsons Diseases of the eye, Ramanjit Sihota, Radhika Tondon. 20th Ed. Elsevier. Pvt. Ltd.
- b. Clinical Ophthalmology – JACK J. KANSKI, 2nd Ed., 1989 Butterworths.
- c. Modern Ophthalmology – L.C. Dutta 3rd Ed., Jaypee publishers.
- d. Ophthalmology for undergraduate students – M.L. Agrawal, L.C. Gupta, Sanjeev Agarwal - Jaypee published 1st Ed.
- e. Text book of ophthalmology – H.V. Nema 4th Ed., Jaypee publishers.
- f. Basic Ophthalmology – Renu Jogi Jaypee publishers.

PAPER – VII - OPTOMETRIC INVESTIGATIONS

Lecture Topics

Unit-I

1. Visual Acuity Testing & Theory
2. Colour Vision Testing & Theory
3. Electro Retino Graphy, E.R.G.
4. Electro Oculo Graphy, E.O.G.
5. Electro Myo Graphy, E.M.G.
6. Electro Nystagmo Graphy, E.N.G.

Unit-II

1. Fluorescein Angiography F.A.
2. Ultrasono Graphy U.S.G.
3. Visual Evoked Response / Potential V.E.R. or V.E.P.
4. Tonometer, Tonometry & Tonography
5. Visual Field Charting & Perimetry
6. Adaptation & Adaptometry
7. Berman's Locator

Unit-III

1. Cryo Technique
2. Diathermy
3. Photo-coagulation
4. Method's of examination (Focal illumination)
5. Slit lamp and attachments
6. Goinoscopy
7. Pachymetry
8. Ocular Photography (Ant.Seg.)
9. Contact & Trans-illumination

Unit-IV

1. pH Testing & Schirmer's Test
2. Fluorescein Staining & Techniques
3. Syringing & Lacrimal Function Test
4. Ophthalmoscopy

5. Retinoscopy
6. Auto-Refractometry
7. Keratometry
8. Ophthalmic Lens Measuring Instruments

Text and reference books

- a. Clinical procedures in Primary Eye Care – David Elliott, Butterworth Heinemann
- b. Basic and Clinical Science Course, American Academy of Ophthalmology (AAO)
- c. Clinical Ophthalmology – JACK J. KANSKI, 2nd Ed. 1989 Butterworths.

SECOND YEAR

PAPER – I - OPTOMETRY-II

OPTICS A

Lecture Topics

1. Introduction Vergence and vergence techniques revised. Lens power, prism power, and cylindrical lenses.
2. Gullstrand's schematic eyes, visual acuity, Stile 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.
6. Applications- to calculate the angular magnification, dioptric power of the spectacles, spectacles 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 the line image in a sphere cylindrical lens.
10. Laser optics- basic laser principles, - spontaneous and emission. Coherencespatial, temporal, laser pumping, population inversion optical feedback laser resonator stability condition. Gas lasers, and solid lasers, Helium-neon laser Argon ion laser-ruby laser. Monocular laser – carbondioxide, eximer laser. Semi conductor lasers. Lasers in medicine.
11. Holography
12. Spatial distribution of optical information- modulation transfer functions-Spatial filtering – applications.

Text and reference Books

- a. Optics, WHA Fincham, 9th edition, Butterworths, 1980.
- b. Optics of human eye – Smith Etichision.

OPTICS B

Lecture Topics

Unit-I: Review of Geometrical Optics

1. Vergence and power
2. Sign convention
3. Spherical refracting surface
4. Spherical mirror; catoptric power
5. Cardinal points
6. Magnification

Unit-II: Optics of Ocular Structure

1. Cornea and aqueous
2. Crystalline lens
3. Vitreous
4. Schematic and reduced eye

Unit-III

(A) Refractive conditions of eye

1. Emmetropia
2. Myopia
3. Hyperopia
4. Astigmatism
5. Presbyopia

(B) Refractive Anomalies and Their Cause

1. Aetiology of refractive anomalies
2. Contributing variabilities and their ranges
3. Populating distributions of anomalies
4. Optical component measurements
5. Growth of the eye in relation to refractive errors

Unit-IV: Accommodation and Convergence

1. Far and Near point of accommodation, range of accommodation amplitude
2. Methods of measurement of Accommodation
3. Near point of convergence of significance

4. Methods of measurements of Convergence
5. Accommodative Convergence Accommodation ratio

Unit-V: Retinoscopy – Principles and Methods

1. Retinoscopy – speed of reflex and optimum condition
2. Retinoscopy – design consideration
3. Review of objective refractive methods
4. Review of subjective refractive methods
5. Cross cylinder methods for astigmatism
6. Difficulties in subjective tests and their avoidance
7. Transposition of lenses
8. Spherical equivalent.

Practical Demonstrations

1. Visual acuity, stereo acuity in 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 – compound myopia
10. Practice of retinoscopy – oblique astigmatism
11. Practice of retinoscopy – media opacities
12. Practice of retinoscopy – in irregular astigmatism
13. Interpretation of cycloplegic retinoscopic findings

Text and reference books

- a. Optics and Refraction – L.P. Aggarwal
- b. Principles of Optics and Refraction – Duke Elder
- c. Optics & Refraction – A.K. Khura
- d. Visual Optics and Refraction – A clinical approach DAVID D.MICHAELS. The C.V. Mosby & Co. 1985.
- e. Principal & Practice of Refraction – N.C. Singhal

PAPER – II - EVIDENCE BASED OPTOMETRY

Lecture Topics

Unit-I: Ophthalmic Lenses Types, Manufacturing, Workshop Practice

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

Unit-II: 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 chromic lenses
6. Polaroid lenses
7. Tinted lenses – absorptive properties
8. Tinted lenses – examples and discussions
9. Special purpose lenses

Unit-III: Spectacle Frames – theory basics (I)

1. History of spectacles
2. Nomenclature and terminology
3. Classification of frames – Temple position, colouration
4. Types of frame materials – advantages and disadvantages

Text and reference books

- a. Principles of Ophthalmic Lenses : M.JALIE
- b. Spectacle Lenses: Theory & Practice – Colin Fowler & Keziah Latham
- c. Ophthalmic Lenses and Dispensing – M Jalie

OPTICS & REFRACTION

Lecture Topics

1. a. Tinted and protective lenses b.
Characteristics of tinted lenses c.
Absorptive glasses
- d. Polarizing filters
- e. Photochromaic 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 present prisms
- c. Reflections from spectacle lenses, ghost images reflection in bifocals at the dividing line.
- d. Anti-reflection coating
- e. Field of the view of the lenses.
- f. Size, shape and mountings of the ophthalmic lenses
7. Effective power of spectacles, vertex distance effects
8. Spectacle magnification and relative spectacle magnification

Text and reference books

- a. Principle of Ophthalmic Dispensing : M.JALIE
- b. Spectacle Lens Theory & Practice – COLIN FOWLER

PAPER – III - ADVANCED ORTHOPTICS

Lecturer Topics

Unit-I

Orthoptic check up and special instruments

- a. Routine Orthoptic examination
- b. Special Orthoptic investigation
- c. Instruments used in Orthoptics
- d. Diagnosis, prognosis & management methodologies Neuro muscular anomalies
 - a. Classification
 - b. Hetrophoria & hetrotopia
 - c. Orthophoria
 - d. Concomitant & non concomitant
 - e. Paralytic squint

Unit-II

Aetiology

Factors responsible

Role of accommodation & convergence

Genetics and occurrence of squint and binocular vision problems. Outline of

Routine Orthoptics examination

Subjective symptoms – description and significance

Unit-III

History – recording and significance

Measurement of angles of deviation

Sensory signs of patients

Clinical picture of types of squint

- a. Accommodative
- b. Intermittent
- c. Alternate
- d. A & V. Phenomenon

Unit-IV

Paralytic squint

Special forms of squint

Unit-V: Neuro-Ophthalmology

- a. Neuro-ophthalmic examination
 1. History & Visual function test
 2. Technique of pupillary examination
 3. Ocular motility
 4. Checklist for testing
- b. Visual sensory system
 1. The retina optic disc, optic nerve, optic chiasma, optic tracts
 2. The lateral geniculate body, optic radiations, visual cortex
 3. The visual field
 4. Disorders of visual system
- 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
 - a. The facial nerve
 - b. Pain and sensation from the eye
 - c. Autonomic nervous system
 - d. Selected system disorders with neuro-ophthalmologic signs

Text and reference books

- a. Ocular motility = VIRGUNIA CARLSON HANSAN
- b. Practical Orthoptics in the treatment of a squint = KETHLYLE & KENNTH WYPER
- c. Handbook of Orthoptic principles – G.T.Willonghby Cashell, Isobel Durran Churchill Livingstone.

PAPER – IV - OCULAR DISEASES II

Lecture Topics

Unit-I: Vitreous

- a. Developmental abnormalities
- b. Hereditary hyaloidoretinopathies
 Juvenile retinoschisis
 Asteroid hyalosis
 Cholestrolosis
- c. Vitreous hemorrhage
 Blunt trauma and vitreous
 Inflammation and vitreous
 Parasitic infestations
 Pigment granules in the vitreous
- d. Vitreous complications in cataract surgery

Unit-II: Retina

- a. Retinal vascular anomalies
- b. Diseases of the choroidal vasculature, Bruch's membrane, and retina pigment epithelium (RPE)
- 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 degeneration
- h. Retinal holes and detachments
- i. Intraocular foreign bodies
- j. Photocoagulation

Unit-III:

Lens

- a. Anatomy and pathophysiology
 - 1. Normal anatomy and aging process
 - 2. Developmental defects
 - 3. Acquired lenticular defects
- b. Management of lenticular defects

Unit 4

Glaucoma

Applied anatomy and physiology of anterior segment

Clinical Examination

Definitions and classification of glaucoma

Pathogenesis of glaucomatous ocular damage

Congenital glaucoma

Primary open angle glaucoma

Ocular hypertension

Normal Tension Glaucoma

Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure)

Secondary Glaucoma

Management : common medications, laser intervention and surgical techniques

Unit 5

Major Eye Diseases & Operative Procedure

Lecture Topics

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

Trauma

- a. Anterior segment trauma
- b. Posterior segment trauma

Blindness

- a. Blindness definitions
 1. Causes
 2. Social implications
 3. Rationale therapy
- b. Drug induced ocular disease.

Text and reference books

- a. Parsons Diseases of the eye, Ramanjit Sihota, Radhika Tondon. 20th Ed. Elsevier. Pvt.Ltd.
- b. Clinical Ophthalmology – JACK J.KANSKI, 2nd Ed., 1989 Butterworths.
- c. Modern Ophthalmology – L.C.Dutta 3rd Ed., Jaypee published.
- d. Ophthalmology for undergraduate students – M.L Agrawal, L.C. Gupta, Sanjeev Agarwal Jaypee published 1st Ed.
- e. Text book of ophthalmology – H.V. Nema 4th Ed., Jaypee published f. Basic Ophthalmology – Renu Jogi Jaypee published

PAPER – V - CONTACT LENSES II

Lecturer Topics

Unit-I

1. Soft contact lens – Law materials, classification, terminology, etc.
2. Manufacturing Soft Contact Lenses –various methods- advantages & disadvantages
3. Various designs Soft Contact Lenses - advantages & disadvantages
4. Pre- Fitting examination – steps, significance, recording of result
5. Special points for in pre-fitting examination of Soft Contact Lenses
6. Discussion with patient choice of lens – type
7. Fitting Soft Contact Lenses general outline
8. Fitting Soft Contact Lenses – methods –Trial set method
9. Using trial lenses, calculations involved

Unit-II

1. Fitting Soft Contact Lenses methods first fit method
2. Methods of assessment of Soft Contact Lenses fit.
3. Types of fit – steep , Flat, Optimum – on spherical cornea
4. Types of fit – steep , Flat, Optimum – on Toric cornea with spherical lenses
5. Types of fit – steep , Flat, Optimum – on Toric cornea with toric lenses
6. Calculation and finalizing of Soft Contact Lenses parameters
7. Ordering Soft Contact Lenses – writing a prescription to the Laboratory
8. Fitting Soft Contact Lenses from stock – advantages, limitations, precautions

Unit-III

1. Checking and verifying Soft Contact Lenses
2. Components of Lens care systems for Soft Contact Lenses
3. Contact lens solutions – composition, necessity, advantages
4. Teaching the patient to insert and remove soft lenses
5. Common handling instruction to first time wearers
6. Special instructions to the patient for using soft lenses
7. Special soft lenses – cosmetics, Disposable , Toric
8. Special Rigid Lenses and designs – Toric, Keratoconus, etc.

Unit-IV

1. Special considerations for fitting Contact Lenses, - Children, irregular cornea, Univocal Aphakia, sports one eyes patients post RK, post PRK
2. Ortho – keratology and myopia
3. Fitting Bifocal and multifocal – RGP & Soft lenses
4. After care and follow up for all Contact Lens patients.
5. Patient Problems – identification, differential diagnosis and management

Text and reference books

- a. Contact Lenses – Dr.V.K.Dada
- b. Contact Lenses Practice – MONTAGUE RUBBEN

PAPER – VI - COMMUNITY OPTOMETRY

PUBLIC RELATIONS

Defining the Subject – Theory and Practice

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 P.R. – 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 Relations: 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, colour, and design-knowledge, of topography and layouts-direct mails, publicity material and house journal. Use of photographs for publications and special events.
3. The spoken word: Public speaking-microphone techniques
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 P.R: Opinion and panel research – drawing up of a

Questionnaire – interpreting the results.

Public Relations in Action

- a) The employee public: The working relationship-labour management relations-
Establishing effective leadership-high cost of breakdowns and alienation-planned effort
at P.R.
- b) The customer public: Needs of customers-efficiency and effectiveness of Customer
service-feedback and suggestion system.
- c) The government public: Knowledge has and interaction with the central government-
state government and municipal government.
- d) The community public: Community opinion-community relations-open house and
volunteer activities

Specialised Public Relations

- 1. Public relations for welfare agencies
- 2. Public relations for health agencies
- 3. Public relations for hospitals
- 4. The perspective: rising demands-escalating costs-charitable heritage public opinion
consciousness-growing consumer movement
- 5. The P.R. program, employee relations – volunteer groups-medical staff,
patients sensitivity to the press and other media.

OCULAR HYGENE

HEALTH EDUCATION

EYE BANKING

PAPER – VII - APPLIED & CLINICAL OPTOMETRY

PEDIATRIC OPTOMETRY

Lecturer Topics

1. History - Genetic factors, Prenatal factors, Perinatal factors, Postnatal factors
2. Measurement of visual acuity
3. Normal appearance, pathology and structural anomalies of:
4. Orbit, Eyelids , Lacrimal system, Conjunctiva, Cornea, Sclera
5. Anterior chamber, uveal tract, pupils
6. Lens, vitreous, fundus
7. Oculomotor system
8. Measurement of the refractive system
9. Determining binocular status
10. Determining sensory motor adaptability 11. Compensatory treatment and remedial therapy for
12. Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia. 13. Remedial and compensatory treatment for strabismus and nystagmus 14. Vergence and accommodation
15. Delayed development

Text and reference Books

- a. Pediatric Optometry – JEROME ROSNER, Butterworth, London 1982.
- b. Binocular Vision and Ocular Motility – VON NOORDEN G.K. Burian Von Noorden's 2nd Ed. C.V. Mosby Co. St. Louis, 1980
- c. Assessing children's vision – Susan Leat - Butterworth Heinemann
- d. Clinical Pediatric optometry – Leonard Press, Bruce Moore, Butterworth Heinemann
- e. Pediatric Neuro-ophthalmology – Robert Tomsak - Butterworth Heinemann
- f. Vision Problems in childhood – Terry Buckingham, Butterworth Heinemann

OCCUPATIONAL OPTOMETRY

Lecturer Topics

1. Introduction to occupational health, hygiene and safety International

Bodies like ILO. WHO, National bodies like Lab or institutes, National institute of occupational health, National Safety Council etc.

2. Acts and Rules Factories

Act, and Rules Workmen's

compensation ESI Act, etc.

3. Occupational diseases/occupational related diseases caused by-physical agents, chemical agents and biological agents

4. Occupational hygiene, environmental monitoring, Recognition, evaluation, control of hazards.

Illumination – definition, measurements, standards. 5.

Occupational safety.

Causes of accidents. Vision, Lighting, colour and their role. Accident analysis. Accident prevention

6. Ocular and visual problems of occupation

Electromagnetic radiation

Ionising Non-ionising-infrared, Ultra violet , Microwave laser Injuries-mechanical, 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 etc.

Selection and use

Testing for standards

9. Standards

Visual standards for jobs.

10. Problems of special occupational groups Drivers, pilots and others

11. Field work – submission of reports

Visits to: Regional Labour Institute selected industries 12. Visual

display units (terminals) VDU/VDT Contact lens and work

Pesticides - general and visual and ocular defects

Text and reference books

a. Encyclopedia of Occupational Health and Safety, ILO Publication, 1983, Vol. I & II.

b. IES Lighting Handbook (LH) 1984, IES Publication, NY 1985.

c. IES Lighting Education introductory lighting (LE) 1985, IES Publication N.Y. 1985

d. Guide to Occupational and other Visual needs – HOLMES C. JOLLIES H. & GREGG J. 1958.

e. Occupational eye diseases and injuries – JOSEPH MINTON, William Heineann Medical Book Ltd., 1949.

f. Environmental Vision – Donald Pits - Butterworth Heinemann

g. Work and the eye – Rachel North - Butterworth Heinemann

h. Ophthalmic research and epidemiology – Stanley Hatch - Butterworth Heinemann

i. Professional communication in eye care – Carolyn Begley - Butterworth Heinemann

j. Sports Vision – D.F.C. Loran, C.J. Mac Eween, Butterworth Heinemann

GERIATRIC OPTOMETRY

Lecturer Topics

1. Structural changes of the eye

2. Physiological changes of the eye

3. Optical and refractive changes of the eye

4. Aphakia,

–

its

correction

5. Ocular diseases common in the old eye, with special reference to cataract, glaucoma Macular disorders, vascular diseases of the eye etc.

Text and reference books.

- a. Vision of the Aging Patient – HIESCH M.J. & WICK R.E. (An Optometric Symposium) 1960.
- b. Vision and Aging – A.J.ROSSENBLUM Jr. & M.W.MORGAN, Butterworth Heinemann 1993.
- c. Clinical Genatric Eye Care – Sheree Aston, Joseph Maino- Butterworth Heinemann
- d. Clinical Decision making in Optometry – Eilen Ettinger, Michael Rouse, Butterworth Heinemann

PAPER – VIII - SYSTEMIC DISEASES AND THE EYE

Lecture Topics

2. ARTERIAL HYPERTENSION

- Pathophysiology, classification, clinical examination, diagnosis, complications and management.
- Hypertension and the eye 3.

DIABETIS MELLITUS

- Pathology, classification, clinical features, diagnosis, complications and management.
- Diabetes mellitus and the eye

4. ACQUIRED HEART DISEASE – EMBOLISM

- Rheumatic fever – pathophysiology, classification, diagnosis, complications and management.
- Embolism
- Subacute bacterial endocarditis 5.

CANCER – INTRODUCTION

- Definitions, nomenclature, characteristics of benign and malignant neoplasm.
- Grading of staging of cancer, diagnosis principles of treatment.
- Neoplasia of the eye.

6. CONNECTIVE TISSUE DISEASE

- Anatomy and pathophysiology : Arthritis
- Eye and connective tissue disease. 7.

THYROID DISEASE

- Anatomy and physiology of thyroid gland, Classification of thyroid disease.
- Diagnosis, complications, clinical features, management, thyroid disease of the eye

8. TUBERCULOSIS

- Etiology, pathology, clinical feature, pulmonary tuberculosis, diagnosis, complications, treatment, tuberculosis and the eye

9. HELMINTHIASIS

- Classification of helminthic disease, schistosomiasis, principles of diagnosis and management.
- Helminthic disease and the eye (Taenia, echinococcus, larvae migrans) 10.COMMON

TROPICAL ILLS, (Malaria, leprosy, etc.)

- Introduction to tropical diseases : Malaria.
- Tropical diseases and the eye – leprosy, toxoplasmosis, syphilis, trachoma. 11.

MALNUTRITION

- Etiology, protein energy malnutrition, water electrolytes, minerals, vitamins, nutritional disorders and the eye.

12.INTRODUCTION TO IMMUNOLOGY

Introduction, components of the immune system, principle of immunity in health.

- Immunology in disease, Immunology and the eye. 13.

NEUROLOGICAL DISORDERS-STROKE/CVA

- Disseminated sclerosis and subacute combined degeneration
- Anatomy and patho-physiology
- Disseminated sclerosis, subacute combined degeneration
- Eye and connective tissue disease.

14.GENERAL, MEDICAL EMERGENCIES – FIRST AID

- Ocular and first aid

15.GENETICS

- Introduction to genetics
- Organisation of the cell
- Chromosome structure and cell division
- Gene structure and basic principles of genetics
- Genetic disorders and their diagnosis
- Genes and the eye
- Genetic counselling and engineering Text

and reference books

a. Parson's Diseases of the eye – Stephen J.H.Miller, 17th edition, Churchill Livingstone.

b. Clinical Ophthalmology – Jack Kanski (JKK), 1st edition, Butterworths c. Principles and practice of ophthalmology – Vol.1& 3 – Peyman, Sanders,

Goldberg Jaypee publishers 1st Ed.

d. System of ophthalmology Vo. XV- Sir Stewart Duke Elder 1976, Henry Kimpton – London.

e. Modern Ophthalmology – Arnold Sorsby , systemic aspects – Vol 2. 2nd Ed. 1977 R.J. Acford Ltd.

SYLLABUS

Epidemiology, Biostatistics and Medical Ethics

UNIT I: Epidemiology

Introduction: Historical aspects and evolution of epidemiology, definitions and concepts in Epidemiology.

Approaches in epidemiology: Descriptive and analytical epidemiology, disease burden, natural history of diseases and measures of risk and death.

Study design and sampling: Sample size estimation and introduction to study design in epidemiological investigations.

UNIT II: Biostatistics

Fundamentals of biostatistics: Introduction, types of data, tabular and graphical presentation of data. Measures of location, dispersion and correlation: Measures of central tendency. Mean, mode, median, GM, HM, quartiles Measures of dispersion—range, standard deviation, variance, coefficient of variation.

Probability and statistical inference: Concept and probability distribution. Normal distribution— density curves, applications and statistical tables. Concept of significance tests, parametric and nonparametric tests, standard error and confidence intervals.

Inferential statistics: Probability and distributions – Poisson, Binomial and Normal distribution – Chi-square test – Hypothesis test - Student's t-test – Correlation and Regression – ANOVA.

UNIT III: Medical Ethics

Bioethics and Medical ethics: Historical perspectives & Introduction to Bioethics, Nuremberg Code, Declaration of Helsinki, Principle of essentiality, informed consent, confidentiality, minimisation of risk, accountability and responsibility. Ethics of clinical trials: Drug trials, vaccine trials, Clinical trials with medical devices/surgical procedures/radioactive materials, Research in transplantation and stem cell therapy. Regulatory framework and guidelines for conduction of human research: Review processes, Institutional ethical committees, composition of committees, review procedures, WHO, UNESCO and ICMR guidelines.

References :

b Epidemiology: An Introduction. Kenneth J. J. Rothman. Latest edition / Pub. Date: May 2002. Publisher: Oxford University Press.

c Epidemiology. Leon Gordis. Latest edition / Pub. Date: November 2004. Publisher: Elsevier Health Sciences.

d Diseases and Human Evolution. Ethne Barnes. Latest edition / Latest edition / Pub. Date: March 2005. Publisher: University of New Mexico Press.

- (f) Epidemiology: Beyond the Basics. F. Javier Nieto, Moyses Szklo. Latest edition / Pub. Date: November 2003. Publisher: Jones & Bartlett Publishers, Inc.
- (g) Basic and Clinical Biostatistics. Beth Dawson, Robert G. Trapp, Robert Trapp. Latest edition / Pub. Date: March 2004.
- (h) Discovering Statistics Using SPSS. Andy Field. Latest edition / Pub. Date: April 2005. Publisher: SAGE Publications.
7. Arora PN & Malhon PK (1996). Biostatistics Imalaya Publishing House, Mumbai.
- g) Sokal & Rohlf (1973). Introduction to Biostatistics, Toppan Co. Japan.
- h) Stanton A & Clantz, Primer of Biostatistics — The McGraw Hill Inc., New York. 10. Government of India. Good Clinical Practices for Clinical Research in India. New Delhi: 2001
- h) Indian Council of Medical Research. Ethical Guidelines for Biomedical Research on Human Subjects. New Delhi: 2000
12. United Nations Educational, Scientific and Cultural Organisation (UNESCO). Universal Declaration on Bioethics and Human Rights. Paris; 2005
