

**P.G. SYLLABUS
M.S. OPHTHALMOLOGY**

GOAL

The purpose of PG education is to create competent specialists in Ophthalmology who would provide high quality health care and advance the cause of science through research & training.

PROGRAMME OBJECTIVES

The post graduate training programme is aimed at developing a blend of qualities of a clinical specialist, a teacher and a researcher in the student. This programme is so organized that at the end, the post graduate student possesses the following qualities, knowledge and skills:

- a. A basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.
- b. The student should be able to practice and handle independently most day-to-day problems in Ophthalmology. The student should recognize the limitations of his/her own clinical knowledge and know when to seek further help.
- c. The student should understand the effects of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of Ophthalmology.
- d. The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of eye disease.
- e. The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.
- f. The student should also be aware of Mobile Ophthalmic Unit , its working and components.
- g. The student should be familiar with the current developments in Ophthalmic Sciences.
- h. The student should be able to plan educational programmes in Ophthalmology in association with senior colleagues and be familiar with the modern methods of teaching and evaluation.
- i. The student should be able to identify a problem for research, plan a rational approach to its solution, execute it and critically evaluate his/her data in the light of existing knowledge.
- j. The student should reach the conclusions by logical deduction and should be able to assess evidence both as to its reliability and its relevance.
- k. The student should have basic knowledge of medico-legal aspects of medicine.
- l. The student should be familiar with patient counseling and proper consent taking.

SUBJECT SPECIFIC COMPETENCIES

A post graduate student upon successfully qualifying in the M.S. (Ophthalmology) examination should be able to:

- a) Offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, in most of the common situations encountered at the level of health services.
- b) Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.
- c) Be aware of her/his own limitations to the application of the specialty in situations, which warrant referral to more qualified centers or individuals.
- d) Apply research and epidemiological methods during his/her practice. The post graduate student should be able to present or publish work done by him/her.
- e) Contribute as an individual/group towards the fulfillment of national objectives with regard to prevention of blindness.
- f) Effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

At the end of the course, the student should have acquired knowledge in the following:

COGNITIVE DOMAIN

Basic Medical Sciences:

- Attain understanding of the structure and function of the eye and its parts in health and disease.
- Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and other parts of the body with influence or control on the structure and function of the eye.
- Attain understanding of and develop competence in executing common general laboratory procedures employed in diagnosis and research in Ophthalmology.

Clinical Ophthalmology:

Given adequate opportunity to work on the basis of graded responsibilities in outpatients, inpatient and operation theatres on a rational basis in the clinical sections. From the day of entry to the completion of the training programme, the students should be able to:

- Acquire scientific and rational approach to the diagnosis of ophthalmic cases presented.
- Acquire understanding of and develop inquisitiveness to investigate to establish cause and effect of the disease.

- To manage and treat all types of ophthalmic cases.
- To competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and muscle anomalies.
- To competently handle all ophthalmic medical and surgical emergencies.
- To be familiar with micro-surgery and special surgical techniques.
- To demonstrate the knowledge of the pharmacological (including toxic) aspects of drugs used in ophthalmic practice and drugs commonly used in general diseases affecting the eyes.

Refraction:

- Acquire competence in assessment of refractive errors and prescription of glasses for all types of refraction problems.
- Acquire basic knowledge of manufacture and fitting of glasses and competence of judging the accuracy and defects of the dispensed glasses.

Ophthalmic super-specialties:

Given an opportunity to work on a rotational basis in various special clinics of sub-specialties of Ophthalmology. The student should be able to:

- Examine, diagnose and demonstrate understanding of management of the problems of neuro-ophthalmology and refer appropriate cases to neurology and neuro-surgery.
- Examine, diagnose and demonstrate understanding of management of (medical and surgical) complicated problems in the field of (a) lens, (b) glaucoma, (c) cornea, (d) retina, (e) pediatric ophthalmology, (f) oculoplasty, (g) uvea, and (I) genetic problems in ophthalmology.
- To demonstrate understanding of the manufacture, and competence in prescription and dispensing of contact lenses and ocular prosthesis.

Ophthalmic pathological/microbiological/biochemical sciences

- Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

Community Ophthalmology

Eye camps may be conducted where the PG students are posted for imparting training according to a set methodology. The community and school surveys may also be conducted by the post graduate students. The post graduate students are given an opportunity to participate in Surveys & eye camps. They should be able to guide rehabilitation workers in the organisation and training of the blinds in art of daily living and in the vocational training of the blind leading to gainful employment.

Research :

- Recognise a research problem.
- State the objectives in terms of what is expected to be achieved in the end.
- Plan a rational approach with appropriate controls with full awareness of

the statistical validity of the size of the material.

- Spell out the methodology and carry out most of the technical procedures required for the study.
- Accurately and objectively record on systematic lines results and observation made.
- Analyze the data with the aid of an appropriate statistical analysis.
- Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- Write a thesis in accordance with the prescribed instructions.
- Write at least one scientific paper as expected of International Standards from the material of this thesis.

AFFECTIVE DOMAIN

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

PSYCHOMOTOR DOMAIN

**At the end of the course, the student should acquire following clinical skills:
Essential diagnostic skills:**

I. Examination techniques along with interpretation

1. Slit lamp Examination

Diffuse illumination

Focal illumination

Retroillumination – direct and indirect

Sclerotic scatter

Specular reflection

Staining modalities and interpretation

2. Fundus evaluation

Direct/Indirect ophthalmoscopy

Fundus drawing

3-mirror examination of the fundus

78-D/90-D/60-D examination

Amsler's charting

II. Basic investigations along with their interpretation

1. Tonometry

Tonometry - Applanation/Indentation/Non-contact

2. Gonioscopy

Gonioscopy grading of the anterior chamber angle

3. Tear/ Lacrimal function tests

Staining- fluorescein and Rose Bengal

Schirmer test/tear film break up time

Syringing

Dacrocystography

4. Corneal

Corneal scraping and cauterization

Smear preparation and interpretation (Gram's stain /KOH)

Media inoculation

Keratometry - performance and interpretation

Pachymetry

Corneal topography - if available

5. Colour Vision evaluation

Ishihara pseudoisochromatic plates

Farnsworth Munsell, if available

6. Refraction

Retinoscopy- Streak/ Priestley Smith

Use of Jackson's cross-cylinder

Subjective and objective refraction

Prescription of glasses

7. Diagnosis and assessment of Squint

Ocular position and motility examination Synoptophore usage Lees screen usage Diplopia charting

Assessment of strabismus - cover tests/prisms bars

vi. Amblyopia diagnosis and treatment

vii. Assessment of convergence, accommodation, stereopsis, suppression

8. Exophthalmometry

Usage of Hertel's exophthalmometer - proptosis measurement

9. Contact lenses

Fitting and assessment of RGP and soft lenses

Subjective verification of over refraction

Complications arising of contact lens use

Educating the patient regarding CL usage and imparting relevant knowledge of the complications arising thereon

10. Low Vision Aids

Knowledge of basic optical devices available and relative advantages and disadvantages of each.

The basics of fitting with knowledge of availability & cost.

III. The post graduate must be well versed with the following investigative modalities although the student may or may not perform it individually.

But, she/he should be able to interpret results of the following tests:

1. Fundus photography

2. Fluorescein angiography

3. Ophthalmic ultrasound A-scan/B scan

4. Automated perimetry for glaucoma and neurological lesions

5. Radiological tests - X rays - Antero posterior/ Lateral view PNS (Water's view) / Optic canal views Localisation of intra-ocular and intra-orbital FBs

Interpretations of -USG/ CT/ MRI Scans

6. OCT and UBM

7. ERG, EOG, and VEP

IV. Minor surgical procedures – Must know and perform independently

Conjunctival and corneal foreign body removal on the slit lamp Chalazion incision and curettage Pterygium excision

Biopsy of small lid tumours Suture removal- skin/conjunctival/corneal/corneoscleral Tarsorrhaphy Subconjunctival injection Retrobulbar, parabulbar anaesthesia Posterior Sub-Tenon's injections

Artificial eye fitting

V. Surgical procedures

1. Must know and can perform independently

Ocular anaesthesia:

Retrobulbar anaesthesia

Peribulbar anaesthesia

Facial blocks- O'Brein / Atkinson/Van lint and modifications

Frontal blocks

Infra orbital blocks

Blocks for sac surgery

2. Must be able to independently perform and deal with complications arising from the following surgeries :

Lid Surgery –

Tarsorrhaphy

Ectropion and entropion

Lid repair following trauma

Epilation

Destructive procedures

Evisceration with or without implant

Enucleation with or without implant

Sac surgery

i. Dacryocystectomy

ii. Dacryocystorhinostomy

iii. Probing for congenital obstruction of nasolacrimal duct

Strabismus surgery

Recession and resection procedures on the horizontal recti.

Orbit surgery

Incision and drainage via anterior orbitotomy for abscess

Cyclocryotherapy/Cyclophotocoagulation

3. PG Student should be well conversant with use of operating microscope and must be able to perform the surgeries listed below competently under the same:

Cataract surgery

Standard ECCE (extracapsular cataract extraction; first year) with or without IOL implantation

Small incision ECCE with or without IOL implantation and/or

Phacoemulsification with PC IOL implantation

Intracapsular cataract extraction (second year)

Cataract with Phacoemulsification (third year)

Secondary AC or PC IOL implantation

Vitreotomy/Scleral buckling

Intra-vitreous and intra-cameral (anterior chamber) injection techniques and doses of drugs for the same.

Needs to know the basis of open sky vitrectomy (anterior segment) as well as management of cataract surgery complications.

Assisting vitrectomy and scleral buckling procedures.

Ocular surface procedures.

Pterygium excision with modifications

Conjunctival cyst excision/foreign body removal

Corneal foreign body removal

Conjunctival flap/ peritomy

Glaucoma

Trabeculectomy

Corneal

Repair of corneo - scleral perforations

Corneal suture removal

Application of glue and bandage contact lens

4. Should have performed/assisted the following microscopic surgeries

i. Keratoplasty

Therapeutic and optical

ii Glaucoma surgery

Trabeculectomy & Pharmacological modulation

Goniotomy

Glaucoma valve implant surgery

5. Desirable to be able to perform following laser procedures

Yag Capsulotomy

Laser iridotomy

Focal and panretinal photocoagulation

6. Should have assisted/knowledge of Kerato refractive procedures

OPERATIONS

The PG is provided with an opportunity to perform operations both extra-ocular and intra-ocular with the assistance of the senior post graduate students and/or under the direct supervision of a faculty member. The student is provided with an opportunity to learn special and complex operations by assisting the senior post graduate student or the faculty in operations of cases of the specialty and be responsible for the postoperative care of these cases.

In **first phase**, the post graduate student is given training in preparations of cases for operation, pre-medication and regional anaesthetic blocks.

In the **second phase**, the post graduate student assists the operating surgeon during the operations.

In the **third phase**, the post graduate student operates independently assisted by senior post graduate student or a faculty member. She/he is required to be proficient in some operations and show familiarity with others.

M.S OPHTHALMOLOGY

SYLLABUS

PAPER I: BASIC SCIENCES AS APPLIED TO OPHTHALMOLOGY

1. Orbital and ocular anatomy
 - i. Gross anatomy
 - ii. Histology
 - iii. Embryology
2. Ocular Physiology
3. Ocular Pathology
4. Ocular Biochemistry
General biochemistry, biochemistry applicable to ocular function.
5. Genetics in Ophthalmology
6. Ocular Microbiology
 - i. General Microbiology, specific microbiology applicable to the eye
 - ii. Immunology with particular reference to ocular immunology
7. Ocular Pharmacology

PAPER II: CLINICAL OPHTHALMOLOGY INCULDING OCULAR SURGERY

1. Disorders of the lids
2. Disorders of the Orbit
3. Disorders of the lacrimal system
4. Disorders of the Conjunctiva
5. Disorders of the Cornea
6. Disorders of the Sclera
7. Disorders of the Uveal Tract
8. Disorders of the Lens
9. Glaucoma
10. Disorders of the Retina
11. Neuro-Ophthalmology including Disorders of the Optic Nerve and Visual Pathway
12. Paediatric Ophthalmology including Strabismus and Amblyopia
13. Ocular oncology

PAPER III: OPTICS, REFRACTION AND INVESTIGATIVE OPHTHALMOLOGY

1. Elementary, Physical and Physiological optics.
2. Error of Refraction and Accommodation.
3. Visual Acuity, Contrast Sensitivity and Test for Potential Vision.
4. Low Vision Aids.
5. Optical Instruments And Techniques Including: Optical Instruments and techniques For Anterior Segment Evaluation, Optical Instruments and techniques For Posterior Segment Evaluation, Laser Scanning Imaging techniques, Optical Coherence Tomography, Optical Devices For eye Surgery and Lensmeter.
6. Perimetry and Other Psychophysical Tests in Glaucoma.
7. Electrophysiological Tests in Ophthalmology.
8. Imaging Techniques in Ophthalmology including : Plain X-rays in Ophthalmology, Ultrasonography in Ophthalmology, Ultrasound Biomicroscopy (UBM) in Ophthalmology, Computed Tomography Scanning in Ophthalmology and Magnetic Resonance Imaging in Ophthalmology

PAPER IV: MEDICAL AND COMMUNITY OPHTHALMOLOGY INCULDING RECENT ADVANCES:

1. Ocular involvement in Systemic Diseases
2. Community Ophthalmology
3. Recent Advances in diagnostic and therapeutic modalities for ocular disorders.