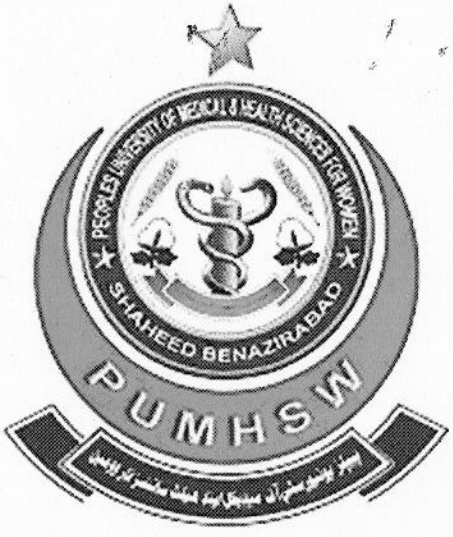
CURRICULUM



MASTERS IN OPHTHALMOLOGY
(M.S)
DEPARTMENT OF OPHTHALMOLOGY

Peoples University of Medical & Health Sciences,
Nawabshah, Sindh.

DEPARTMENT OF OPHTHALMOLOGY

PEOPLES UNIVERSITY OF MEDICAL AND HEALTH SCIENCES FOR WOMEN

Dr.Khan Muhammad Nangrejo — Prof. & Chairman of Department
Dr. Amjad Ali Sahto — Associate Professor

P.G. Curriculum
MS in Ophthalmology

The infrastructure and faculty of the Department of Ophthalmology will be as per PM&DC regulation.

1. Duration: 4 years

2. Goals

The goal of Post graduate (MS) course in Ophthalmology is to produce a competent ophthamologist who:

- Recognizes the health needs
- Has acquired the competencies pertaining to Ophthalmology that are required to be practiced in the community and at all levels of health care system;
- Has acquired skills in effectively communicating with the child, family and the community;
- Is aware of the contemporary advances and developments in medical sciences as related to Eye care;
- Is oriented to principles of research methodology; and
- Has acquired skills in educating medical and paramedical professionals, - Diagnose ocular ailment on the analysis of history, physical examination and investigative work up;
- Plan and advise measures for the prevention of eye disease and visual disability.

_Carryout common surgical procedures independently.

_ Plan rehabilitation of patients suffering from ocular illness and handicap, and those with special needs;

_ Manage ocular emergencies efficiently;

_ Recognize the emotional and behavioral characteristics of persons with moral disability patients and keep this fundamental attributes in focus while dealing with them.

_ Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities;

_ Develop skills as a self-directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze relevant published literature in order to practice evidence-based medicine

_ Facilitate learning of medical/nursing students, practicing physicians, para-medical health workers and other providers as a teacher-trainer;

_ Play the assigned role in the implementation of national programs for control of blindness, effectively and responsibly;

_Organize and supervise the desired managerial and leadership skills;

_Function as a productive member of a team engaged in health care, research and education.

Rotation (Mandatory)

- One Month in Neurology
- 15 Days in DMRD Radiology
- 15 Days in Dermatology

OPHTHALMOLOGY DEPARTMENT

Peoples University of Medical & Health Sciences Hospital
Nawabshah, (Distt: Shaheed Benazir Abad)

Prof: Dr. Khan Mohammad Nangrejo
M.C.P.S, F.C.P.S
CHAIRMAN Ophthalmology

Dr. Amjad Ali Sahto
M.C.P.S, F.C.P.S
ASSISTANT PROFESSOR

MS EXAM COURSE FOR OPHTHALMOLOGY

Program:

1. MS 1 Exam as entry test
2. MS 11 Exam on the completion of requirement

Duration of course----------4 years

SYLLABUS AND TABLE OF SPECIFICATIONS FOR MS PART 1(OPHTHALMOLOGY)

Topics	Marks
Anatomy 1. Ocular Embryology 2. Orbit and adnexa 3. Ocular Anatomy 4. General Anatomy	35
Physiology 1. Ocular Physiology 2. Physiology of vision 3. Systemic physiology	25
Pathology 1. Ocular Pathology 2. General Pathology 3. Immunology 4. Microbiology 5. Genetics	32
Pharmacology	08
Total Questions	100

DETAILS OF AREA

ORBIT AND ADNEXA

1. the osteology of orbit
2. eyelids
3. conjuctiva
4. lacrimal glands and drainage System
5. Extraocular muscles
6. intraorbital nerves, vessels, vascular supply, orbital fat and fascia

Ocular anatomy

1. conjunctiva
2. cornea
3. Sclera
4. Limbus and aqueous outflowa pathways
5. iris and pupil
6. Lens and pupil
7. Ciliary body
8. Choroid
9. retina and retinal pigment epithelium
10. vitreous
11. Optic nerve

The cranial cavity

1. Osteology of the skull
2. meninges, blood supply, nerve supply
3. veonous sinuses – cavernous sinus, connection and relations.
4. Foramina and their contents
5. cranial fossae
6. pituitary gland and its relations
7. trigeminal ganglion

Central Nervous system

1. Cerebral hemispheres and cerebellum
2. internal Structure
3. Cortical areas
4. ventricles-formation and circulation of fluid
5. blood supply and venous drainage
6. brain stem- Midbrain, Pons, Medulla and fourth ventricle
7. cranial nerves-origin, course and distribution
8. spinal cord, venous plexus, meninges, and subarachnoid space
9. visual pathways-visual cortex, cortical connection and associated areas

10. structure involved in control of eye movements
11. Autonomic nervous system and the eye

Head and neck anatomy

1. Nose. Mouth, and paranasal air sinuses
2. lateral wall of nose, , vessels and nerves, Osteology
3. the face and scalp
4. muscles, nerves and vessels, temporal fossa, zygomatic arch, salivary gland and temporamandibular joint
5. the infratemporal fossa and pterygopalatine fossa
6. Muscles, vessels, nerves, carotid sheath, pterygopalatine ganglion
7. posterior triangle, anterior triangle, suprahyoid region, prevertebral region, root of the neck
8. thyroid and para thyroid gland, sympathetic chain
9. carotid vessels
10. sympathetic chain
11. respiratory system – the anatomy of the mouth, pharynx, soft palate and larynx with particular reference to bulbar palsies and tracheostomy
12. lympathatic drainage of the head and neck including face

Physiology
Ocular physiology

1. Eyelid – functions and blink mechanism
2. Lacrimal system – Gland and Drainage system
3. Tear film – formation, composition and function.
4. Cornea-metabolsim and choroid.
5. Uvea – iris, cillary body and choriod.
6. lens – metabolism and function
7. Aqueous humor hydrodynamics
8. intra ocular pressure
9. vitreous- composition and function
10. retina: neurochemistry, photochemistry and function
11. retina pigment epithelium
12. optic nerve- function
13. visual pathway
14. Action Extracular muscles
15. Neural control of eye movements
16. Blood ocular barrier

Physiology of vision

1. visual acuity
2. colour vision
3. contrast sensitivity
4. binocular single vision system
5. Electrophsiology of visual system
6. visual field and visual pathway
7. Entopic phenomena
8. Accommodation
9. papillary reflexes
10. Light dectection
11. dark adaptation

System physiology

1. the cell: cell structure and function, transport of through cell membrane
2. membrane potential
3. acid base balance
4. blob-blood cell blood groups blood clothing mechanism
5. bodyfluids –intracellular fluids
6. Homeostasis
7. Shock

Pathology

Ocular pathology

1. inflammation – intraocular inflammation due to idiopathic and specific agents
2. sympathetic ophthalmitis conditions
3. conjunctiva, cornea and sclera
4. eyelids –lesions of eyelids
5. tumours of the uveal tract
6. lens
7. retina – general dedenerativa and vascular disorders
8. tumours of neuroepithelium
9. glaucoma
10. optic nerve
11. tumours of the orbit
12. lymphoid hyperplasias and lymphomata
13. congenital anomalies
14. accidental and surgical trauma
15. graft reaction
16. phacomatosis

Pathology (General)

1. Cell response to injury
2. Acute inflammation: chemical mediators, cellular mechanisms
3. chronic inflammation
4. wound healing
5. disorder of Growth –hyperplasia, hypertrophy, atrophy and dystrophy
6. vascular diseases: atheroma, thrombosis, embolism, ischemia and infarction
   angiogenesis, diabetic microangiopathy
7. Neoplsia: terminology, characteristics of being and malignant tumours
   Caricinogenesis, gene control, oncogenes, effects of irradiation and cytotoxic drugs
8. Spread of malignant tumors
9. Disturbance endocrine dysfunction –pituitary, thyroid, parathyroid pancreas and adrenal glands.
10. General reaction to trauma, haemorrhage and shock
11. Disturbance of body fluid and electrolyte imbalance
12. Disturbance of endocrine dysfunction –pituitary, thyroid, parathyroid, pancreas and.
    Adrenal gland
13. Calcium metabolism

IMMUNOLOGY

1. cells, tissues and organization of the immune
2. immune system host defence mechanisms of the eye
3. immunological tolerance
4. Autoimmune disease
5. immune system induced tissue damage and the eye, including allergy and hypersensitivity reaction
6. major histocompatibility system
7. transplant immunology including corneal transplant immunology

MICROBIOLOGY

1. Gram staining and culture
2. bacteria –classification, and pathogeneses
3. viruses –classification, replication and laboratory methods of detection
4. HIV AND AIDS Viruses
5. Fungi –classification and their pathogeneses
6. toxoplasmosis
7. Chlamydia
8. acanthamoeba
9. Helminthic infiction
10. sterilization, disinfection and asepsis
11. and cell division
12. autosomal dominat recessive and X –liked inheritance
13. mitochondrial inheritance
14. gene mutation and disorder

PHARMACOLOGY

1. Ocular pharmacokinetics including ocular drug delivery system
2. Receptor pharmacology: cellular mechanisms of drug action
3. ocular pharmacology of:
4. tear substitutes
5. cholinergic agents
6. adrenergic agents
7. osmotic agents
8. carbonic anhydrase inhibitors
9. prostaglandin agonists.
10. anti-inflammatory agents-steroidal and non steroidal
11. antimicrobiological agents-
12. antibiotics -mechanism of action
13. antiviral -mechanism of action
14. antiviral -mechanism of action

SYLLABUS AND TABLE OF SPECIFICATIONS FOR MS PART I I(OPHTHALMOLOGY)

1. THEORY PAPER (Short essays, BCQ,s, Problem oriented questions)

OPTICS AND REFRACTION

1. physical optics

- properties of light
- electromagnetic spectrum
- wave theory
- particle theory
- diffraction
- interference
- resolution
- scattering
- transmission and absorption
- photometry
- lasers

2. Geometric optics

I. Reflection

- Laws of reflection
- Reflection at a plane surface
- Reflection at curved surface

II. **Refraction**

- Laws of refraction (snell's law)
- Refraction at a plane surface
- Refraction at curved surface
- Critical angle total internal reflection

III. **Prism**

- Definition
- Notation
- Uses in ophthalmology (diagnostic and therapeutic)
- Types of prism

IV. **Spherical lenses**

- Cardinal points

- Thin lens formula
- Thick lens formula
- Formation of image
- Vergence power (diopteric power)
- Magnification
- Spherical decetration and prism power
- Lens form

V. **Astigmatic Lenses**
- Cylinder lenses
- Maddox rod
- Toric lenses
- Conoid of strum
- Jackson's cross cylinder

VI. **Notation of lenses**
- Spectacle prescribing
- Simple transposition
- Toric transposition

VII. **Identification of unknown lenses**
- Neutralization
- Focimeter
- Geneva lens measure

VIII. **Aberrations of lenses**
- Correction of aberrations relevant to the eye
- Duochrome test

3. **Clinical optic**

I. **Optic of the eye**
- Transmittance of light by the optic media
- Schematic and reduced eye
- Papillary response and its effect on the resolution of the optic system (Stiles-crawford effect)
- Visual acuity
- Contrast sensitivity
- Catoptric images
- Emmetropia
- Accommadation
- Purkinje shift
- Pinhole

II. **Ametropia**
- Myopia
- Hypermetropia
- Astisometropia
- Aniseikoia
- Aphakia

III. **Accommodative problems**
- Insufficiency
- Excess
- AC /A ratio

IV. **Refractive errors**
- Prevalence
- Inheritance
- Change with age
- Surgically induced

V. **Correction of ametropia**
- **Spectacle lenses**
- **Contact** with age
- **Intraocular lenses**
- **Principles of refractive surgery**

VI. **Problem of spectacles**
- **Effective of spectacles in aphakia** on accommodation and convergence spectrum and contact lenses
- Effective power of lenses
- Back vertex distance
- Spectacle magnification
- Calculation of intraocular lenses power
- Presbyopia

VII. **Low vision aids**
- High reading addition
- Magnifying lenses
- Telescopic aids – Galilean telescope

4. Clinical refraction
- Retinoscopy
- Subjective refraction
- Measurement of BVD
- Muscle balance test
- Accommodative power
- Measurement of IPD
- Decentration of lenses and prismatic affect

- Best form lens
- Prescribing multifocal lenses
- Prescribing for children
- Cycloplegic refraction

5. **Instruments**
   - Direct ophthalmoscope
   - Indirect ophthalmoscope
   - Retinoscope
   - Focimeter
   - Simple magnifying glass (loupe)
   - Lensmeter
   - Automated refractor
   - Slit –lamp microscope – including methods of examination
   - Stereo –test
   - Keratometer
   - Applanation tonometer
   - Specular microscope
   - Operating microscope
   - Zoom lens principle
   - Corneal phacometry
   - LEES screen / HESS Chart
   - Synoptophore
   - Goldman perimeter
   - Humphery perimeter
   - Lenses used for fundus biomicroscopy (panfundoscope, goldmann lens, hruby lens, 90d lens.etc)
   - Fundus camera
   - Gonioscope
   - Lasers
   - Biometer

Clinical Ophthalmology:

1. **Eyelids**
   - Allergic disorder
   - Infection
   - Benign nodules and cysts
   - Malignant tumors
   - Ectrpion
   - Entropion
   - Ptosis

2. **lacrimal system**
   - Evaluation of lacrimation
   - Evaluation of epiphora
   - Management of watery eye
   - Dry eye

3. **Conjunctiva**
   - Infections
   - Allergic infalammations
   - Mucocutaneous disorder
   - Degenerations
   - Bening lesions
   - Malignant lesions

4. **Cornea**
   - Keratitis
   - Degeneration
   - Dystrophies
   - Ectasias
   - Drug induced disorders
   - Metabolic disorders
   - Keratoplasty
   - Photorefractive keratectomy
   - LASIK
   - LASEK

Sclera
- Episcleritis
- Scleritis

lens

classification of cataract
congenital cataract
acquired cataract
management of cataract
ectopia lentis

Glaucoma

Evaluation of glaucoma patient, techniques and tests
Primary glaucomas
Secondary glaucomas
Congenital glaucoma
Medical management of glaucoma
Surgical management of glaucoma
Lasers in glaucoma

8. **Uveitis**
   Idiopathic uveitis
   Uveitis associated with systemic disorders
   Management of uveitis
   Uveal tumors

9. **Retina**
   Retinal detachment
   Congenital and acquired macular disorders
   Retinal vascular disorders – diabetic retinopathy and hypertensive
   And hypertensive retinopathy
   Lasers in retinal disorders

10. **Strabismus**
   Amblyopia and its management
   Evaluation of strabismus
   Eso and Exo surgery
   Principles of surgery

11. **Orbits**
   Thyroid eye disease
   Infections / inflammation
   Vascular malformation
   Tumors
   Blow out fracture of the orbit

12. **Neuro ophthalmology**
   Neuro imaging and interpretation
   Optic nerve and its abnormalities
   Pupil – normal control and abnormalities
   Cranial nerve associated with eye
   Visual pathway and its abnormalities
   Intracranial space occupying lesions
   Papilloedema
   Headache and migraine

13. **Ocular manifest of systemic disorders**
   Vascular disorders
   Metabolic disorders
   Endocrine disorders
   Infective disorders

14. **Ocular trauma**
   Trauma to ocular surface
   Blunt trauma
   Penetrating trauma

Intraocular foreign body.

Trauma to eyelids and adnexa .

PRACTICAL:

1.TOACS EXAM(50 marks)

10-12 stations—Static, Observed, interactive

Syllabus:

- Clinical methods

-Ophtalmoscopy direct and indirect

-Slit lamp biomicroscopy,90 D,Suprafield.

-Applanation tonometry.

-Gonioscopy

-Tripple mirror examination

-Pupillary examination.

-cover tests

-Ocular motility

-Visual field testing(confrontation test)

- Emergency covers
- Investigations, procedure and interpretations

--Biometry

-FFA

Indocyanine green angiography.

-Perimetry

-MRI.

-CT Scan

-Topography .

-OCT.

-Amslar Gird.

-Elecroretinogram.

-elecro-oculography.

-Darkadaptometry.

-Colour vision test.

2. LONG CASE(50 marks)

3. SHORT CASES(50 marks)

4. REFRACTION(50 marks)

Ophthalmic Optics

_ Elementary Optics

_ Elementary Physiological Optics

_ Refraction

_ Refractive Errors of the Eye.

END.