

# Course Description

## Course Objectives

Course 432 is meant to introduce Medical Students to basic history taking and examination of the eye.

The common ophthalmic conditions will be taught, including the principles for management of these conditions. This material will be released to the Students through:

1. Lectures
2. Clinical teaching sessions
3. Clinic attendance
4. Surgical sessions attendance

At the end of the course, the Medical Student should be able to recognize common ocular pathology, manage simple cases and know when to refer more serious problems.

## Course Outline

Lectures	Time
1. Applied anatomy and physiology of the Eye	1 hour
2. Lid and lacrimal system problems	1 hour
3. Red Eye and ocular emergencies	2 hours
4. Strabismus, amblyopia, and leukocoria	2 hours
5. Errors of refraction	1 hour
6. Systemic Diseases	2 hours
7. Neuro-ophthalmology	1 hour
8. Ocular Pharmacology and drug toxicity	2 hours
9. Acute visual loss	1 hour

## Clinical Skills

1. External ocular examination, ocular motility & alignment	3 hours
2. Visual acuity & ophthalmoscopy	3 hours
3. Visual field, tonometry & pupil examination	3 hours

## Distribution of Assessment Marks

At the end of the six weeks rotation in Ophthalmology, the Student will sit for a Continuous Assessment Examination. This will consist of forty (40) multiple choice questions (40 marks), covering clinical aspects of the subject and topics taken in lectures.

At the end of the cycle, he or she will sit for a Final Examination consisting of 20 clinical pictures that will concentrate on testing the students ability to recognize clinical signs and formulate a decent differential diagnosis and treatment.

### Summary

1.	Continuous assessment	40 MCQ's	(40 marks)
2.	Final OSCE		(60 marks)
		Total	100 marks

## Detailed Curriculum

### Applied Ophthalmic Anatomy and Physiology

1. Embryonic Tissue Derivatives. (Not important; only as an entry topic)
2. Structure, Function and Pathology:
  - a) General topography:
    - Symmetry of lids, lid crease, relation of lids to corneas, direction of lashes
    - Orbital margins
    - Diameters of the cornea.
    - Axial length of the globe and orbit.
    - Power of the eye (cornea and lens)
    - Site of lacrimal gland, lacrimal sac and nasal opening of nasolacrimal duct.
    - Corneal light reflection and its importance.
    - Ocular movements and position of gaze and muscle responsible for each movement.
  - b) Simplified lid anatomy, function and possible pathology e.g. blepharitis, chalazion, ptosis, etc.
  - c) Conjunctiva - Bulbar, palpebral and Goblet cells and role in tear film, loss of Goblet cells.
  - d) Cornea - Layers, transparency. Pathology - oedema, opacity, thinning, etc.
  - e) Sclera - Brief anatomy, muscle attachments. Pathology - scleritis.
  - f) Iris/Pupil - Structure, innervation.
  - g) Anterior Chamber and Angle.
    - Boundary of anterior chamber
    - Component of angle
    - Open angle and closed angle.
  - h) Ciliary body
    - Component
    - Muscle, innervation, attachment to scleral spur.
    - Accommodation, attachment of zonule.

- Aqueous secretion, adrenergic receptor and carbonic anhydrase.
- Relation of vitreous base.

i) Limbus

- Junction between conjunctiva, cornea and sclera.
- Site of most intraocular surgeries.

j) Lens - Position, diameter, fine anatomy, clarity, accommodation.

k) Retina/Macula/Optic Nerve Head.

Layer, (sensory and RPE), blood supply, nutrition, photoreceptors, nerve fiber layer, visual pigment, vitamin A, role of RPE, effect of light.

- Anatomical specification of macula, arcuate nerve fiber and vessels.
- Optic nerve head (Blind spot), papillomacular bundle.
- Rod 120 million, cone 7 million, optic nerve fiber 1 million.
- Relation of retinal topography and VF.
- Importance of decussation at chiasma.
- No fluorescein leakage.

l) Choroid - Brief anatomy, importance.

m) Vitreous - Attachment; base, around disc, macula, blood vessel.

Pathology; Retinal tears, etc.

n) Orbit.

- Bone; ethmoiditis
- Muscle; innervation and function
- Optic nerve length
- Blood vessels
- Nerves
- Fissure

o) Lacrimal System

- Tear film, 3 layers and function
- Tear secretion
- Tear excretion, including lacrimal pump.
- Pathology; Epiphora, NLD system, KCS-Schirmer test, Lacrimal gland disorder, dacrocystitis, DCR.

Glaucomas - Diagnosis and management

1) Criteria in Common

- a. Increase IOP.
- b. Angle specification.
- c. Optic nerve pathology.
- d. VF characteristics

2) Types, Etiology, Mechanism and Management

a) Open angle glaucoma.

- Primary; Definition, mechanism, diagnosis, management
- Secondary; Inflammation, angle recession, heterochromia, pigment dispersion, phacolytic and pseudoexfoliation.

b) Angle Closure.

- Primary; Sub acute, acute, chronic, definitions, mechanism, diagnosis, management.
- Secondary; Neovascular, phacomorphic, and tumor.

c. Congenital

1. Primary; Presentation, mechanism, diagnosis, management, inheritance and incidence.
2. Secondary; Rubella, neurofibromatosis, Sturge Weber syndrome, etc.,

## Red eye

1. of Red Eye: Conjunctivitis, iritis, keratitis (abrasion and FB), angle closure, glaucoma, corneal ulcer.

Comparing of the following parameters: onset, vision, pain, photophobia, discharge, types of infection, state of the cornea, pupillary size, others.

2. Types of conjunctivitis: DX and management.

Bacterial, chlamydia, viral, allergy including vernal.

3. Types of corneal ulcers: DX and management

Bacterial, Dendritic and Zoster and Fungal.

4. Corneal FB; Welder's keratitis

5. Subconjunctival hemorrhage

## Disease of Retina and Choroid

1. Retinal detachment

a) Types:

- Rhegmatogenous
- Exudative
- Tractional

b) DX and management

c) Predisposing factors: Trauma, myopia, vitreoretinal degeneration (including lattice), aphakia, etc.

2. Diabetes Mellitus

3. Hypertension

4. Retinopathy of prematurity (retrolental fibrop.)

5. Retinal vascular occlusion - artery and vein.

6. Retinitis pigmentosa.

7. Retinoblastoma.

8. Malignant melanoma of the choroid.

9. Choroiditis and retinitis (a few examples, no detail, Toxo and Tb).

## Ocular Emergencies

1. Classification including presentation and management.

a) Immediate action (within 1 hour)

- CRAO
- Chemical burn
- Endophthalmitis

b) Very urgent (within 3 - 6 hours)

- Ruptured globe
- Endophthalmitis
- Acute angle closure glaucoma

c) Urgent (within 6 - 24 hours)

- Blunt trauma
- RD
- External ocular infection

2. Selected subjects, presentation and management

a) Corneal abrasion

b) Corneal ulcer

c) Giant cell arteritis

d) Hazardous works and ocular protection

e) Blowout fracture

## Strabismus

1. Definition

2. Ocular muscles, innervation and function.

3. Types of ocular deviation: Concomitant and non-concomitant.
4. Diagnosis: Corneal reflection and cover test.
5. Adaptation: Abnormal head position, suppression and amblyopia.
6. Association of strabismus.
7. Therapy.
8. Non comitant and deviation
  - Symptoms
  - Etiology
  - Diagnosis
  - Therapy

#### Amblyopia

1. Definition
2. Importance of early detection, including visual development
3. Predisposing factors.
4. Presentation and detection.
5. Role of General Practitioner and urgency to refer.
6. Management

#### Errors of Refraction

1. Principles of optics.
2. Types of refractive errors in myopia, hypermetropia (+aphakia), astigmatism, presbyopia.
  - Problem: Symptoms, principles and correction
3. Optical correction:
  - Glasses (different types) - C.L. (types)
  - IOL (types)- LVA
4. Surgery for refractive errors, R.K., epikeratophakia & PKP.

#### Systemic Diseases of the eye

1. Include: Endocrine, cardiovascular, connective tissue, muscle, skin, infection and inflammation and hereditary and hematopoietic disorders.

#### 2. Endocrine diseases:

- a. Graves disease
- b. Parathyroid gland disorder
- c. Diabetes Mellitus - Detail/Retina section.

#### 3. Cardiovascular disorder:

- a. Aging
- b. Hypertensive retinopathy - Detail retina section.
4. Disorders of connective tissue, muscle and skin.
  - a. Marfan Syndrome
  - b. Sjogren Syndrome
  - c. Rheumatoid arthritis
  - d. Chronic juvenile arthritis (Still's)
  - e. Ankylosing spondylitis.
  - f. Giant cell arteritis.
  - g. SLE
  - h. Behcet's disease.
  - i. Reiter's syndrome.
  - j. Myasthenia gravis
  - k. Steven Johnson's Syndrome
  - l. VKH.

#### 5. Infection and inflammation disorders,

- a) Syphilis:
  - Congenital - triad
  - Acquired - 1ry, 2ry, 3 ry
- b) TB
- c) Leprosy
- d) Venereal transmitted diseases:
  - chlamydia
  - inclusion conjunctivitis and ophthalmia neonatorum
  - viral
  - lymphogranuloma venereum
  - H. simplex
    - e) Toxoplasma - Detail in retina section,
    - f) Toxocariasis.
    - g) Onchocerciasis
    - h) Rubella
    - I) Measles
    - j) Cytomegalic inclusion disease: congenital / acquired.
    - k) Adenovirus - PCF & EKC
    - l) Sarcoidosis

#### 6. Hereditary disorders

- a) Trisomy (Down Syndrome)
- b) Mucopolysaccharoidosis; e.g. Hurler Syndrome
- c) Wilson's disease.
- d) Albinism
- e) Homocystinurea
- f) Galactosaemia

#### 7. Disorders of hematopoietic system

- a) Sickle cell anemia
- b) Polycythaemia
- c) Multiple myeloma
- d) Leukemia

#### Eye care in children and prevention of amblyopia and blindness

##### 1. Introduction

- a) Persons responsible about eye care in children
- b) Importance of children's eye care

##### 2. Amblyopia: Definition and types

##### 3. Ocular disorders in children leading to amblyopia and blindness: Presentation, management, precautions and prevention.

- a) Genetically determined; e.g. cataract, glaucoma, and retinoblastoma
- b) Acquired condition; e.g. trauma and infection
- c) Others; e.g. retinopathy of prematurity

##### 4. Recommendation and conclusion

Screening of all newborn children at different stages of life is highly recommended to ensure early detection and management of the different disorders that may lead to amblyopia and blindness.

##### 5. Causes of blindness in Saudi Arabia: including percentage of treatable and preventable blindness.

###### Disorders of the Lens

- 1. Brief embryology of the lens
- 2. Brief congenital disorders; e.g. coloboma , etc.
- 3. Causes of ectopia lentis; e.g. Marfan, Homocystin urea and trauma.

#### 4. Cataract;

##### a) Definition

##### b) Etiology

- Congenital- Inflammatory, e.g. Rubella
- Metabolic, e.g. Galactosaemia
- Chromosomal, e.g. Down Syndrome
- Hereditary, e.g. Wilson Disease
  
- Complicated- Drug induced, e.g. steroid
- Irradiation
- Trauma
- Uveitis
- Senile

##### c) Management:- Include congenital, unilateral, bilateral and type of surgery

- Adult surgery
- Treatment of aphakia
- Management of amblyopia in children.

#### 5. Lens induced ocular problem.

- a) Phacomorphic glaucoma
- b) Phacolytic glaucoma
- c) Phacoallergic uveitis
- d) Posterior subluxation
- e) Anterior subluxation
- f) Aphakic retinal detachment

#### Neuro-ophthalmology

##### 1. Applied Neuro anatomy

##### a) Visual pathway:

- optic nerve, lesion, papillitis and VF
- Chiasm, lesion, and VF
- Tract, lesion, and VF
- Radiation, lesion and VF
- Cortex, lesion and VF

##### b) Pupil

- Reflexes; Direct, consensual and near
- RAPD
- Argyl Robertson pupil (light / near dissociation)
- DDX of Anisocoria

Miosis: Drugs, inflammation, sleep, Horner's syndrome, syphilis– and pontine hemorrhage.

Mydriasis: Drugs, trauma, angle closure glaucoma, midbrain lesion– and Cr.III nerve palsy.

##### c) Motor nerves

- Cr. III n. palsy; Difference between posterior communicating aneurysm and D.M.
- Cr. IV n. palsy
- Cr. VI n. palsy; False localizing in increased ICP, DM and S. hypertension. part of sign of cerebello pontine angle tumors.
- Cr. VII n. palsy: Exposure keratitis, Bell's phenomenon.

##### 2. Raised I.C.P. and papilloedema

- Space occupying lesion and cerebro.
- Difference between papilloedema and papillitis.

##### 3. Cerebrovascular disorders and ocular signs.

- Atheroma of carotid -- unilateral amaurosis fugax, CRAO and BRAO.

- Atheroma of basilar system -- bilateral amaurosis fugax, cortical blindness.
- Aneurysm of posterior communicating artery -- complete painful Cr. III n. palsy
- Aneurysm of carotid in cavernous sinus -- carotid cavernous fistula -- pulsating proptosis.
- Carotid sinus thrombosis.
- Giant cell arteritis -- Ischaemic optic neuropathy.

#### Leukocoria

1. Definition: White pupil and importance
2. Retinoblastoma, cataract, retinopathy of prematurity, PHPV, etc.
3. Management

#### Ocular Toxicology

1. Complication of topical administration:
  - mechanical
  - pigmentation
  - ocular injury: e.g. topical anesthetic or preservative
  - sensitivity
  - comparison between topical and systemic use of dose
2. Ocular reaction of syst. drug:
  - ethyl alcohol
  - methyl alcohol
  - chloroquine
  - ethambutol
  - contraception pill
  - hypervitaminosis A and hypovitaminosis A

#### Ocular pharmacology, drug toxicity and proptosis

##### 1. Ocular Pharmacotherapeutics

###### a) Cholinergic Stimulating Drugs:

- Local effect
- System effect
  - i) Direct acting:
    - e.g. Miochol
    - e.g.– Pilocarpine - mechanism of action in both angle closure and open– angle glaucoma.
  - ii) Indirect acting
    - Reversible–
    - Irreversible; e.g.– phospholine iodide with action, side effect and precautions.
  - iii) Cholinergic blocking agents:
    - Mechanism–
    - Ocular– effect
    - Systemic– effect
    - Examples of drugs and duration of action.
    - Atropine, Scopolamin, Homatropine, Cyclopentolate and Tropicamide

###### b) Adrenergic compounds

- Adrenergic stimulating:
  - e.g.– Epinephrine, Propine, Phenylephrine
- Adrenergic blocking
  - e.g.– Timolol - effect, mechanism, side effects.

###### c) Carbonic Anhydrase Inhibitor.

- Effect, side effect and type

###### d) Osmotic agent.



- Mechanism, therapy and drugs.
- e) Anti-inflammatory
- Glauco corticoid– (therapy, side effect)
  - Antihistaminic,– sodium
- f) Antibiotics
- Penicillin,– Cephalosporin, Aminglycoside, Tetracyclin,
  - Chloramphenicol–
  - Effect, side– effect.
- g) Ocular mycosis chemotherapy
- Amphotericin B,– Nystatin, Natamycin
- h) Anti viral.
- I) Local anesthetic - topical, infiltration, effect and side effect, manifestation of syst. toxicity,
- j) Dye: Flourescein & Rose bengal.