THE EGYPTIAN FELLOWSHIP

OPHTHALMOLOGY

CURRICULUM

The structure and Regulation of Ophthalmology Training

2011-2012
Preface

The Egyptian Fellowship Board and the Ophthalmology scientific council worked collaboratively and closely to make this curriculum available for trainees’ guidance and support. Postgraduate medical education worldwide is now governed by sets of academic standards that describe the qualities and abilities of graduates. In addition, there are standards for the training processes, trainers’ selection and methods of assessment standards that ensure transparency and clarify expectations.

The Egyptian fellowship board has already defined and published its standards for the general and professional competencies expected from our graduates in different specialties upon successful completion of training. These expectations are clearly reflected in the Ophthalmology curriculum.

The curriculum describes what trainees will know and be able to do upon completion of training. In addition, methods of teaching and learning needed to deliver the curriculum are outlined. The curriculum also describes in details, expectations from trainees during their rotations. Methods of assessment and examination regulations are also available.

All topics covered during practical and theoretical studies are outlined. This will help trainees to guide their readings and their choice of learning activities. In addition, all required clinical cases and procedures are listed together with expected performance at various stages of training.

To help our trainers, supervisors and maximize benefits, we provided a guide for required lectures at various training stages. Mandatory courses are also mentioned and the Egyptian Fellowship Board will work closely with Ophthalmology scientific council to ensure proper organization of courses at appropriate training stages.

We hope that all our trainees, trainers and educational supervisors will follow the guides provided in the curriculum and cooperate with the Egyptian Fellowship Board and Ophthalmology Scientific Council to implement the curriculum in the best ways.

*Prof. Dr. Hany Mohammed Hafez*

*General Secretary*

*The High Committee of Medical Specialties*
Acknowledgement

This curriculum has been created through collaboration between the Ophthalmology Scientific Council and The Egyptian Fellowship Curriculum Committee. The following members of the Ophthalmology Scientific Council have made substantial contribution to the curriculum development as subject matter experts.

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The Egyptian Fellowship Curriculum Committee has made significant contribution to the curriculum through Collaboration with the council in the design and formulation of the educational structure.

The member who participated in this work is:
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Intended Learning Outcomes (ILO’s)

The curriculum should basically test the following areas:
1. Knowledge (acquired through organized lectures by qualified personnel and experts in every field of ophthalmology)
2. Skills (intellectual & professional) (acquired through hands-on training and observation as well as active participation in patient care in recognized well equipped hospitals and ophthalmology centers)
3. Transferrable skills, attitudes & behaviors (acquired through observation and active fellowship with more senior qualified ophthalmology specialists and consultants)
4. Continuous medical education (CME)(achieved through continuous participation in & attendance of regional, national and international ophthalmology conferences & workshops)

A. KNOWLEDGE

The basic code is as follows:
A.1. Ocular Embryology
A.2. Ocular Anatomy, Histology and anatomy of Head and Neck
A.3. Ocular and general Physiology
A.4. Cell biology and biochemistry
A.5. Optics & Refraction
A.6. Ocular Microbiology
A.7. Ocular and general Pathology
A.8. Genetics
A.9. Immunology
A.10. Ocular Pharmacology
A.11. Epidemiology and biostatistics
A.12. Medical Ophthalmology
A.13. Ophthalmic Surgery
A.14. Ocular Emergencies
A.15. Ocular examination Techniques

A.1. OCULAR EMBRYOLOGY

Expected year of completion: 1st year
Assessment: part 1 exam
Description:
The candidate should be able to understand the normal development of the human eye, Embryology of the eye and visual system, Development of the eye and visual system during childhood and the Congenital anomalies of the eye and visual system

A.1.1: Describe in details the formation of the optic vesicle, the lens vesicle, the optic cup and the chroidal fissure.

A.1.2: Illustrate the development of the primary and secondary lens fibres and the formation of lens sutures and lens capsule and the suspensory ligaments.

A.1.3: Describe the development of the primary, secondary and tertiary vitreous and consequent changes in hyaloid artery and tunica vasculosa lentis.
A.1.4: Describe the development of both pigment and neural layers of the retina, the macula and the fovea centralis, the optic nerve from the optic axons and the optic stalk and central retinal artery and vein.

A.1.5: Describe the formation of the anterior and posterior chambers, the cornea and the uveal tract.

A.1.6: Explain the formation of the sclera and extraocular muscles from the mesenchymal condensation.

A.1.7: Describe the development of the lacrimal gland, lacrimal sac and nasolacrimal duct, the eyelids cilia, ciliary and tarsal glands from the surface ectoderm, and the orbital bones, the orbicularis muscle, levator palpebrae superioris muscle and tarsal plates from the mesenchyme.

A.1.8: Demonstrate the congenital anomalies resulting from abnormalities in the development of the different structures of the eye and adnexa.

A.2: OCULAR ANATOMY AND HISTOLOGY

Expected year of completion: 1st year

Assessment: part 1 exam

Description:
The candidate should be able to describe the anatomy and histology of the normal human eye with their illustrations and understand their clinical applications.

A.2.1: Outline the anatomy of the skull and nasal sinuses and illustrate the anatomy of the orbit in details

A.2.1.1: Enumerate the bones forming the skull, the foramina of the anterior, middle and posterior cranial fossa.

A.2.1.2: Describe the meninges and the venous blood sinuses.

A.2.1.3: Describe the bones forming the orbit, the orbital openings and the surface anatomy of the orbital region.

A.2.1.4: Describe the site, relations, shape and bones forming the paranasal sinuses.

A.2.1.5: Describe the normal radiological appearance of the orbits and paranasal sinuses.

A.2.2: Demonstrate the anatomy and histology of the ocular adnexa namely the lacrimal apparatus, the eyelids and the extraocular muscles.

A.2.2.1: Describe the anatomy and histology of the lacrimal gland with its two parts, its blood and nerve supply, and the lacrimal drainage system starting from the puncti to the end of the nasolacrimal duct.

A.2.2.2: Describe the landmarks and structure of the eyelids with its anterior and posterior lamellae, lid margin, fascial attachments including the orbital septum, Whitnall’s and Lockwood ligaments, medial and lateral canthi, glands, blood supply, nerve supply and lymphatic drainage.

A.2.2.3: Describe the structure, origin, insertion; function and nerve supply of the muscles of the eyelids namely the orbicularis oculi, the levator palpebrae superioris and the superior and inferior tarsal muscles.

A.2.2.4: Illustrate the origin, insertion, course, nerve supply actions and nerve supply of the extraocular muscles.
A.2.3: **Describe the normal anatomy and histology of the eyeball.**

A.2.3.1: Describe the anatomy of the conjunctiva: the palpebral and bulbar parts, the fornices and its histological layers.
A.2.3.2: Describe the fascial sheath of the eyeball (Tenon’s capsule) and the check ligaments.
A.2.3.3: Describe the microscopic structure of the sclera and episcleral tissue, colour, thickness, sites of perforations, blood and nerve supply.
A.2.3.4: Illustrate the different layers of the cornea, vascular and nerve supply, the changes at the limbus, canal of Schlemm.
A.2.3.5: Describe the minute anatomy of the iris: stroma, smooth muscles and pigment epithelium.
A.2.3.6: Describe the anatomy of the ciliary body and the ciliary processes.
A.2.3.7: Describe the structure, blood and nerve supply of the choroid and the anatomy of the vortex veins.
A.2.3.8: Describe the chambers of the eye and the structures forming the anterior chamber of the eye.
A.2.3.9: Describe the structure and attachments of the lens by the suspensory ligaments.
A.2.3.10: Describe the structure and attachments of the vitreous body.
A.2.3.11: Illustrate the different layers of the retina namely retinal pigment epithelium and different neural layers and describe the retinal cells, changes at the macula and fovea, the ora serrata and the normal appearance of the fundus including the vessels and the optic nerve head.

A.2.4: **Describe the normal anatomy and histology of the visual pathway.**

A.2.4.1: Demonstrate the detailed anatomy of the intracranial, intracanalicular, intraorbital & intraocular parts of the optic nerve, its vascular supply and meningeal coverings.
A.2.4.2: Outline the anatomy, relations, and distribution of nerve fibres in the optic chiasma, optic tract and optic radiation.
A.2.4.3: Describe the vascular supply, relations, and functional and histological layers of the lateral geniculate body and occipital cortex.

A.2.5: Describe the anatomy of 3rd, 4th, 5th, 6th and 7th cranial nerves as regards their origin from the brain stem, course, relations and termination.

A.2.6: Outline the autonomic nerve supply of the orbit and describe the afferents, efferents and relations of the ciliary ganglion.

A.2.7: Knows the important anatomical relations in the cranial cavity, the gross anatomy of the Central nervous system, Gross anatomy of the head and neck and cardiovascular and respiratory systems.

**A.3. OCULAR AND GENERAL PHYSIOLOGY**

**Expected year of completion:** 1st year

**Assessment:** part 1 exam

**Description:**
The candidate should be able to describe the normal physiology of the eye & the normal physiology of vision as well as the various biochemical basis of ocular & visual function

A.3.1: Illaborate the Physiology of tear production and drainage, normal physiology of the tear film & ocular surface (cornea & conjunctiva), the layers of the tear film, its micromolecular components, its natural defense mechanisms, its production, drainage and turnover as well the corneal and conjunctival epithelial surfaces and their role in ocular defense mechanism.
A.3.2: Describe the normal physiology & biochemistry of the aqueous humour (formation & drainage), its electrolyte constituents, protein concentration, circulation, as well as its homeostatic function in metabolism of the avascular structures of the anterior segment of the eye, namely the lens and cornea.

A.3.3: Explain the normal physiology & biochemistry of the natural crystalline lens, its metabolism and capsule characteristics and permeability & accommodation.

A.3.4: Describe the normal physiology & biochemistry of the retina & optic nerve as well as the basis of apoptosis and neuroprotection. Describe the physiology of Retinal phototransduction, Light detection, & dark adaptation.

A.3.5: Describe the physiology of the normal visual pathway
   A.3.5.1: Elaborate Magnocellular and parvocellular pathways
   A.3.5.2: Explain the physiology of the pupillary reflexes
   A.3.5.3: Describe the physiological bases of visual acuity assessment, visual field tests and contrast sensitivity

A.3.6: Elaborate the normal physiology & biochemistry of color vision as well as the different types of cones in the retina and the wavelength spectral characteristics of every class.

A.3.7: Describe the physiological characteristics of extraocular muscles, Physiology of eye movement control and Accommodation

A.3.8: Explain the normal physiology of binocular vision, the prerequisites of binocular vision, the concepts of the horopter & Panum’s fusional area as well as the grades of binocular vision & stereopsis.

A.3.9: Elaborate the physiological bases of electrophysiological testing, the normal tracings of the electroretinogram (ERG), electrooculogram (EOG) and visual evoked potential (VEP) & the findings in abnormal disease states.

A.3.10: Describe the physiology of the choroid and blood aqueous barriers

A.3.11: Describe the physiology of the vitreous

A.3.12: Should have general knowledge about Basic general physiology including Cardiovascular, Respiratory, Haematological, Renal systems, Neurophysiology, Maintenance of homeostasis and Endocrinology

A.4. CELL BIOLOGY AND BIOCHEMISTRY

Expected year of completion: 1st year
Assessment: part 1 exam
Description:
A.4.1. Knows the Structure of the cell & cell membrane & the Production and use of energy by cells
A.4.2. Understand the Metabolism of carbohydrates, lipids, proteins and amino acids, the Protein synthesis, structure and function of proteins, and enzyme mechanisms
A.4.3. Knows the Connective tissue and the extracellular matrix structure
A.4.4. Understand the DNA structure and function, Cell signaling and Active oxygen species
A.4.5. Knows the Basic laboratory techniques in cell biology such as polymerase chain reaction, in-situ hybridization, immuno-localization, ELISA assays, and Western, Northern and Southern blotting

A.4.6. Understand the Cell biology and biochemistry of ocular tissues and fluids including cornea, sclera, uveal tract, lens, vitreous, retina, tears, aqueous humour, and vitreous

A.5. OPTICS AND REFRACTION

Expected year of completion: 1st year
Assessment: part 1 exam and part 3 (clinical) exam
The candidate should be able to understand the principles and concepts involved in clinical optics and refraction as well as ophthalmic instruments.

A.5.1: Describe the physical properties of light: electromagnetic spectrum, wave theory, particle theory, diffraction, interference, resolution, polarization, scattering, transmission and absorption of electromagnetic radiation by the eye, photometry, and propagation in different media, principles of reflection (plane and curved surfaces) and refraction (plane and curved surfaces), refractive index, critical angle, total internal reflection and principles of the pinhole.

A.5.2: Demonstrate the optical principles of spherical lenses (cardinal points, thin lens formula, thick lens formula, formation of the image, vergence power, magnification, spherical decentration and prism power, lens form), Astigmatic lenses (cylindrical lenses, Maddox rod, toric lenses, conoid of Sturm, Jackson’s cross cylinder) and toric lenses, notation of lenses and aberrations of lenses.

A.5.3: Describe the physical properties of Lasers: coherence, laser physics, laser properties, types of ophthalmic laser, tissue effects of laser, photocoagulation, photoablation, photodisruption, drug-enhanced laser absorption, optical coherence tomography

A.5.4: Describe the optical principles of prisms, notation, uses, types of prisms, prentice rule & Fresnel prisms.

A.5.5: Describe the optics of the human eye as an optical system including the principles of the schematic and reduced eye, ametropia and its correction, accommodation, accommodative abnormalities and presbyopia.

A.5.6: Describe methods and formulae of intraocular lens power calculation.

A.5.7: Describe the low vision aids especially simple magnifying lenses, and telescopic (Galilean and Keplerian) aids.

A.5.8: Understand the principles of clinical refraction and lens prescription.
   A.5.8.1: Understand retinoscopy
   A.5.8.2: Describe the subjective refraction
   A.5.8.3: Describe media opacity with retinoscopy.
   A.5.8.4: Understand glasses prescription, prescribing for children and accommodative power.
   A.5.8.5: Understand Best form lenses, Back vertex distance for glasses and the prismatic effect of decentration.

A.5.9: Describe the optical principle and types of contact lenses, techniques of contact lens fitting, contact lens verification, complications and contraindications.
A.5.10: Describe the principle of commonly used clinical tests namely contrast sensitivity, colour vision, stereo tests and Hess/Lees screen.

A.5.11: Explain with illustrations the optical principle and describe the uses of some ophthalmological instruments.

A.5.11.1: Explain with illustrations the optical principle & describe the uses of the direct ophthalmoscope.
A.5.11.2: Explain with illustrations the optical principle & describe the uses of the indirect ophthalmoscope.
A.5.11.3: Explain with illustrations the optical principle & describe the uses of the retinoscope.
A.5.11.4: Explain with illustrations the optical principle & describe the uses of the focimeter.
A.5.11.5: Explain with illustrations the optical principle & describe the uses of simple magnifying loop.
A.5.11.6: Explain with illustrations the optical principle & describe the uses of the automated refractometer.
A.5.11.7: Explain with illustrations the optical principle & describe the methods of corneal topography: Placebo disc, keratometer & automated corneal topography.
A.5.11.8: Explain with illustrations the optical principle & describe the uses of slit lamp, Applanation tonometry & slit lamp biomicroscopy
A.5.11.9: Explain with illustrations the optical principle & describe the lenses used in gonioscopy.
A.5.11.10: Explain with illustrations the optical principle & describe lenses used in fundus examination & laser treatment of the iris, lens & posterior segment.
A.5.11.11: Explain with illustrations the optical principle & describe the uses of the operating microscope.
A.5.11.12: Explain with illustrations the optical principle & describe the methods of corneal pachymetry
A.5.11.13: Explain with illustrations the optical principle & describe the uses of specular microscope.
A.5.11.14: Explain with illustrations the optical principle & describe the uses of the synoptophore.

A.6. OCULAR MICROBIOLOGY

Expected year of completion: 2nd year
Assessment: part 1 & 3 exams
Description:
The candidate should be able to describe Host defense mechanisms of the eye & the common ocular pathogens.

A.6.1: Describe the classification scheme of the various micro-organisms affecting the eye (Microbial pathogenesis: colonization, invasion, endotoxins, exotoxins, & virulence)

A.6.2: Describe the staining properties, culture characteristics, microscopic morphology, pathogenicity & virulence of the various bacteria & commensal eye flora infecting the eye.
A.6.3: Describe the microscopic morphology, nucleic acid structure, cellular affinity, antigenic characteristics, classification, structure & replication, antiviral agents, laboratory methods of viral detection & virulence of the different viruses infecting the eye.

A.6.4: Describe the microscopic morphology, culture characteristics, natural habitat, virulence, classification, host susceptibility factors, antifungal agents of the different fungi infecting the eye.

A.6.5: Describe the morphology, life cycle & pathogenicity of the various parasites (helminthic infections) infesting the eye.

A.6.6: Define prions & neurodegenerative diseases

A.6.7: Describe the other common ocular infectious diseases as Toxoplasmosis, chlamydia, acanthamoeba

A.6.8: Define & describe methods of Sterilization, disinfection & asepsis

A.6.9: Describe Antimicrobial therapies & bacterial resistance

A.7. OCULAR & GENERAL PATHOLOGY

Expected year of completion: 2nd year
Assessment: part 1, 2 & part 3 (OSPE & oral) exam
Description:
A.7.1. The candidate should know the bases of general pathology & be able to describe the various pathological bases of ocular diseases & conditions.
   A.7.1.1: elaborate the various pathological cellular & gross mechanisms involved in ocular inflammation, wound healing & repair.
   A.7.1.2: describe the pathology of the intraocular tumors, their epidemiology & histopathological features including retinoblastoma, malignant melanoma, neuroblastoma, lymphoma & ocular metastasis as well as other less common ocular & adnexal tumors.

A.7.3: List the histopathological changes involved in age related macular degeneration, the changes in Bruch’s membrane & the retinal pigment epithelium, the pathology of drusen & the complications of choroidal neovascularization & pigment epithelial & neurosensory retinal detachment.

A.7.4: Describe the pathology of various retinal & optic nerve diseases.


A.8. GENETICS

Expected year of completion: 2nd year
Assessment: part 1, 2 exam & part 3 (oral) exam
Description:
The candidate should know the genetic basis of eye diseases, genetic counseling, population genetics & Molecular genetics: the genome, DNA analysis, gene therapy

A.8.1: Understand the genetic patterns of inheritance, penetrance and chromosomal abnormalities.

A.8.2: Elaborate the genetic pattern of different hereditary diseases especially corneal and retinal dystrophies, ectopia lentis, metabolic disorders, ocular syndromes, and collagen diseases.

A. 9. IMMUNOLOGY

Expected year of completion: 1st year
Assessment: part 1 exam
The candidate should know the bases of immunology

A.9.1: Describe the cells and tissues of the immune system, the Organization of the immune system, Host defense mechanisms with particular reference to the eye and Host response to injury.

A. 9.2: Describe innate immunity, complement and phagocytic cells. Adaptive immunity: MHC antigens, antigen presenting cells; T cell and B cell activation, antibody responses, effector mechanisms in cell mediated and humoral immunity.

A.9.3: Describe Autoimmunity and immune tolerance, Allergy, anaphylaxis and hypersensitivity reactions, Immunodeficiency and immunosuppression, Transplantation immunology, particularly with respect to the cornea and Immunology of the eye

A. 10. OCULAR PHARMACOLOGY

Expected year of completion: 1st year
Assessment: part 1 and part 3 (oral) exam
Specific classes of pharmacological agents of relevance to ophthalmology: adrenergics, cholinergics, serotonergics and histaminergics, eicosanoids, corticosteroids, local anaesthetics, analgesics, drugs used to treat glaucoma, immunosuppressive and anti-inflammatory drugs, tear substitutes, botulinum toxin, anti-VEGF therapies

Description:
The candidate should be able to elaborate the various drugs used in the treatment of ocular diseases. The candidate should have knowledge of the drug Pharmacokinetics and pharmacodynamics, regarding chemical structure, mode of action, formulation, route of application, metabolism, indications, contraindications as well as drug-receptor interactions.

A.10.1: Mention in details the pharmacology of the drugs used in glaucoma treatment
A.10.2: Mention in details the criteria of the chemotherapeutics, including antibiotics, antifungal, antiviral & antiparasitic.
A.10.3: Mention in details the criteria of mydriatic-cycloplegic drugs.
A.10.4: Describe the uses of topical and systemic steroids and their complications
A.10.5: Know the different corneal lubricants.
A.10.6: Mention in details the criteria of intravitreal drugs & anti-VEGF.

A.10.7: Describe the chemical nature and physical characteristics of viscoelastic substances and silicon oil.

A.10.8: Describe Mechanisms of drug toxicity, including ocular toxicity from systemic drugs and systemic side effects of ocular agents and Methods of drug delivery to the eye.

A.11. EPIDEMIOLOGY AND BIOSTATISTICS

**Expected year of completion:** 1st year

**Assessment:** part 1 exam

The candidate should understand Descriptive statistics and Evidence based medicine


A.11.2: Understand Clinical study design: types of clinical studies, bias, errors, randomization, power, sample size calculation, confidence intervals, reliability and validity

A.11.3: Define blindness and cite main causes of blindness worldwide

A.11.4: Describe methods of Screening for ocular disease: principles of screening, evaluation of screening programs, sensitivity and specificity and Evidence based medicine

A.12. MEDICAL OPHTHALMOLOGY

**Expected year of completion:** 4th year

**Assessment:** Case presentations, part 2 and part 3 exam

**Description:**

The candidate should be able to describe the various eye diseases, their epidemiology, clinical picture and management and apply this knowledge to efficient patient care, examination and management.

A.12.1: Elaborate the various orbital diseases

A.12.1.1: elaborate the various lid malpositions, etiology, epidemiology, clinical picture and management.

A.12.1.2: describe the epidemiology, etiology, clinical picture and management of thyroid ophthalmopathy.

A.12.1.3: discuss the epidemiology, etiology, clinical picture and management of the various orbital infections.

A.12.1.4: describe the epidemiology, etiology, clinical picture and management of the various orbital tumors.

A.12.1.5: list the various techniques of orbitotomy and describe with labeled diagrams the different approaches for accessing the orbit.
A.12.2: Describe the various diseases of the cornea and sclera
   A.12.2.1: Give a detailed account of the epidemiology, etiology, clinical picture and management of infectious keratitis and apply such knowledge for efficient patient care.
   A.12.2.1.1: demonstrate the salient features of microbial keratitis.
   A.12.2.1.2: demonstrate the salient features of viral keratitis.
   A.12.2.1.3: demonstrate the salient features of fungal keratitis.
   A.12.2.1.4: demonstrate the salient features of Acanthamoeba keratitis
   A.12.2.2: Elaborate the epidemiology, inheritance, genetics, clinical picture and management of corneal dystrophies.
   A.12.2.3: Give a detailed account of the epidemiology, clinical picture and management of keratoconus.
   A.12.2.4: Describe the epidemiology, etiology, clinical picture and management of episcleritis.

A.12.3: Give a detailed account of the main features of diseases pertaining to an abnormal intraocular pressure and optic nerve
   A.12.3.1: Elaborate the mechanism, epidemiology, clinical picture, investigations and management of primary open angle glaucoma.
   A.12.3.2: Elaborate the mechanism, epidemiology, clinical picture, investigations and management of primary angle closure glaucoma.
   A.12.3.3: Elaborate the mechanism, epidemiology, clinical picture, investigations and management of secondary glaucoma.
   A.12.3.4: Elaborate the mechanism, epidemiology, clinical picture and management of congenital glaucoma.

A.12.4: Illustrate in details the diseases of the natural crystalline lens.
   A.12.4.1: Illustrate with diagrams the different classification schemes of lens opacities as well as describe the different types of cataract morphology and stages.
   A.12.4.2: Explain the etiology, epidemiology, clinical picture & management of ectopia lentis.

A.12.5: Describe in details the various diseases & conditions affecting the eye in the pediatric age group.
   A.12.5.1: Account on the various binocular vision disorders.
   A.12.5.2: Elaborate the different types, clinical picture, epidemiology and management of childhood esotropia.
   A.12.5.3: Elaborate the different types, clinical picture, epidemiology and management of childhood exotropia.
   A.12.5.4: Elaborate the different types, clinical picture, epidemiology and management of childhood restrictive motility disorders.
   A.12.5.5: Describe in details the different procedures used in the surgical management of childhood motility disorders and apply this knowledge to perform simple procedures on the extraocular muscles.

A.12.6: Describe the various medical diseases affecting the retina, their fundus picture and flourescein angiography patterns.
   A.12.6.1: Elaborate with details the epidemiology, stages, clinical picture, complications and management of diabetic retinopathy.
A.12.6.2: Elaborate the epidemiology, etiology, clinical picture, complications and management of retinal vascular occlusion.
A.12.6.3: Discuss the epidemiology, stages, clinical picture and complications of hypertensive retinopathy.
A.12.6.4: Describe the pathology, stages, clinical picture, complications and management of sickle cell retinopathy.
A.12.6.5: Elaborate the details of the epidemiology, etiology, stages, risk factors, clinical picture, complications, management and prophylaxis of retinopathy of prematurity.
A.12.6.6: Describe the epidemiology, etiology, clinical picture and management of retinal telangiectasia.
A.12.6.7: Elaborate the pathology, clinical picture, types, complications and management of age related macular degeneration.
A.12.6.8: Elaborate the etiology, epidemiology, pathology, clinical picture and management of central serous chorioretinopathy.
A.12.6.9: Elaborate the different causes, pathology, clinical picture and management of cystoid macular oedema.
A.12.6.10: Describe in details and identify the pathology, clinical picture and complications of myopic fundus changes.
A.12.6.11: Describe the etiology, pathology, clinical picture and complications of angioid streaks.
A.12.6.12: Describe the etiology, clinical picture and management of choroidal folds.
A.12.6.13: Elaborate the etiology, clinical picture and management of toxic maculopathies.
A.12.6.14: Describe the pathology, genetics, inheritance pattern, epidemiology, types, clinical picture and management of retinitis pigmentosa.
A.12.6.15: Describe the pathology, genetics, epidemiology and clinical picture of Leber’s congenital amaurosis.
A.12.6.16: Elaborate the epidemiology, pathology, clinical picture and complications of the different fundus dystrophies.
A.12.6.17: Describe the pathology, clinical picture and types of ocular and cutaneous albinism.

A.12.7: Account on the various surgical problems affecting the retina and their standard treatment protocols.
A.12.7.1: Describe with illustrated diagrams the types, etiology, epidemiology, clinical picture, differential diagnosis, complications and management of the different types of retinal detachment.
A.12.7.2: Demonstrate with details the etiology, pathology, epidemiology, stages, clinical picture, investigations and management of macular hole and macular pucker.
A.12.7.3: Describe the indications, contraindications, techniques and complications of the various surgical procedures used in the management of retinal disorders.

A.12.8: Describe the tumors of the uveal tract and retina.
A.12.8.1: elaborate the predisposing factors, pathology, epidemiology, clinical picture, investigations and treatment of choroidal, ciliary body and iris melanoma.
A.12.8.2: elaborate the predisposing factors, pathology, epidemiology, clinical picture, investigations and treatment of retinoblastoma.
A.12.8.3: elaborate the pathology, epidemiology, clinical picture, investigations and treatment of metastatic carcinoma of the eye.
A.12.8.4: give a detailed account on the different causes of leukocoria in a child.
A.12.9: Describe the different disease conditions affecting the optic nerve, visual pathway and the ocular motor nerves.
   A.12.9.1: elaborate the different acquired optic nerve disorders.
      A.12.9.1.1: Discuss in details the etiology, epidemiology, pathology, clinical picture and management of the different types of optic neuritis.
      A.12.9.1.2: Elaborate the epidemiology, pathology, clinical picture and management of anterior ischemic, toxic optic neuropathy and diabetic papillopathy.
      A.12.9.1.3: Elaborate the etiology, stages, clinical picture, differential diagnosis, complications and management of papilloedema.
   A.12.9.2: Describe the different congenital optic nerve disorders.
   A.12.9.3: Elaborate the etiology, epidemiology, clinical picture and management of disorders of the higher visual pathway.
   A.12.9.4: Elaborate the etiology, epidemiology, clinical picture and management of disorders of the ocular motor nerves.

A.12.10: Correlate the effects of various systemic diseases on the eye
   A.12.10.1: Elaborate the effect of diabetes mellitus on the eye including diabetic cataracts and diabetic retinopathy.
   A.12.10.2: Elaborate the effect of systemic arterial hypertension on the eye and identify in details the changes occurring in hypertensive retinopathy.
   A.12.10.3: Describe the effect of metabolic disorders on the eye.
   A.12.10.4: Describe the effect of multiple sclerosis on the eye.

A.12.11: Describe the various inflammatory conditions of the uveal tract.
   A.12.11.1: Elaborate the various ophthalmic associations of arthritis, sarcoidosis and Behcet’s disease.
   A.12.11.2: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of acute and chronic anterior uveitis.
   A.12.11.3: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of intermediate uveitis.
   A.12.11.4: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of posterior uveitis.
   A.12.11.5: Elaborate the etiology, pathology, clinical picture, complications and management of the glaucomatocyclitic crisis.

A.12.12: Describe the various infectious, allergic and degenerative diseases of the conjunctiva.
   A.12.12.1: Elaborate the etiology, pathology, clinical picture, complications and management of various infectious diseases of the conjunctiva, acute or chronic.
   A.12.12.2: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of degenerative conjunctival diseases
   A.12.12.3: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of allergic conjunctivitis
   A.12.12.4: Elaborate the etiology, pathology, clinical picture, complications and management of the various types of conjunctival pigmenations.
   A.12.12.5: Elaborate the etiology, pathology, clinical picture, complications and management of the various conjunctival tumors.
   A.12.12.6: Elaborate the etiology, pathology, clinical picture, complications and management of the various cicatrizing conjunctival diseases
A.13. OPHTHALMIC SURGERY

Expected year of completion: 4th year
Assessment: Log book assessment, part 2 and part 3 exam
Description:

The candidate should be able to detail the indications, contraindications and preoperative preparation and illustrate with detailed labeled diagrams the surgical techniques and details of the postoperative care and management of the complications of the different surgical procedures used in management of different ophthalmic diseases and conditions.

A.13.1: List the indications, contraindications and preoperative preparation and illustrate with detailed labeled diagrams the surgical techniques and details of the postoperative care and management of the complications of the different oculoplastic surgical procedures.
A.13.1.1: Describe the indications, contraindications and preoperative evaluation and describe with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical procedures used in the management of blepharoptosis.
A.13.1.2: List the indications, contraindications and preoperative evaluation and describe with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical procedures used in the management of lid entropion.
A.13.1.3: List the indications, contraindications and preoperative evaluation and describe with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical procedures used in the management of ectropion.
A.13.1.4: Describe the indications, contraindications and preoperative evaluation and describe with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical procedures used in aesthetic lid surgery such as dermatochalasis.
A.13.1.5: Describe the detailed preoperative evaluation and describe with labeled diagrams the different surgical techniques as well as the postoperative care and complications of the different surgical procedures used in the repair of lid lacerations and cut wounds.

A.13.2: List the indications, contraindications and preoperative evaluation and illustrate with labeled diagrams the different surgical techniques as well as the postoperative care and complications of the different surgical procedures used in lacrimal surgery.
A.13.2.1: Elaborate the indications, contraindications and preoperative evaluation and demonstrate with labeled diagrams the technique as well as the postoperative care and complications of lacrimal probing and intubation.
A.13.2.2: List the indications, contraindications and preoperative evaluation and illustrate with labeled diagrams the surgical technique as well as the postoperative care and complications of dacryocystectomy operation.
A.13.2.3: Describe the indications, contraindications and preoperative evaluation and illustrate with details the different surgical techniques as well as the postoperative care and complications of dacryocystorhinostomy operation.
A.13.3: Describe in details the indications, contraindications and preoperative evaluation and demonstrate with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical procedures used in cataract extraction.
A.13.3.1: Describe the indications, contraindications and preoperative evaluation and demonstrate with labeled diagrams the surgical technique as well as the postoperative care and complications and their management of extracapsular cataract extraction surgery with intraocular lens implantation.
A.13.3.2: List the indications, contraindications and preoperative evaluation and describe in details the different techniques as well as the postoperative care and management of complications of phacoemulsification with intraocular lens implantation.
A.13.3.3: Describe the indications, contraindications and preoperative evaluation and describe the surgical technique as well as the postoperative care and management of complications of secondary intraocular lens implantation.
A.13.3.4: Describe the indications, contraindications and preoperative assessment and describe the techniques as well as the complications of YAG laser capsulotomy.

A.13.4: Describe the indications, contraindications and preoperative evaluation and illustrate with labeled diagrams the different surgical techniques as well as the postoperative care and management of complications of the different surgical and laser procedures used in the management of the different types of glaucoma.
A.13.4.1: List the indications, contraindications and preoperative evaluation and demonstrate the surgical technique as well as the postoperative care and management of complications of goniotomy operation.
A.13.4.2: Describe the indications, contraindications and preoperative evaluation and demonstrate the surgical technique as well as the postoperative care and management of complications of trabeculotomy operation.
A.13.4.3: Discuss the indications, contraindications and preoperative evaluation and illustrate diagrammatically the surgical technique as well as the postoperative care and complications and their management of trabeculectomy operation.
A.13.4.4: Describe the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of non-penetrating glaucoma filtering surgical procedures.
A.13.4.5: List in details the indications, contraindications and preoperative evaluation and describe the surgical techniques as well as the postoperative care and complications and their management of the different glaucoma drainage devices.
A.13.4.6: Describe the indications, contraindications as well as complications and their management of the use of wound modulating agents and antifibrotic agents in glaucoma surgery.
A.13.4.7: List the indications, contraindications and preoperative evaluation and demonstrate the surgical technique as well as the postoperative care and complications and their management of the different cyclodestructive procedures.
A.13.4.8: Describe in details the indications, contraindications and preoperative evaluation and illustrate with diagrams the surgical techniques as well as the postoperative care and complications and their management of the different combinations of glaucoma surgical procedures as well as combined glaucoma and cataract extraction procedures.
A.13.5: List the indications, contraindications and preoperative evaluation and illustrate with labeled diagrams the different surgical techniques as well as the postoperative care and management of the complications of the different surgical procedures used in the management of strabismus.

A.13.5.1: Describe in details the indications, contraindications and preoperative evaluation and demonstrate with labeled diagrams the different surgical techniques as well as the postoperative care and complications and their management of the different surgical procedures used in the management of esotropia.

A.13.5.2: Describe in details the indications, contraindications and preoperative evaluation and demonstrate with labeled diagrams the different surgical techniques as well as the postoperative care and complications and their management of the different surgical procedures used in the management of exotropia.

A.13.5.3: List the indications, contraindications and preoperative evaluation and describe the different surgical techniques as well as the postoperative care and complications and their management of the different surgical procedures used in the management of vertical strabismus.

A.13.5.4: Describe the indications, contraindications and preoperative evaluation and demonstrate the different surgical techniques as well as the postoperative care and complications and their management of the different surgical procedures used in the management of paralytic and restrictive strabismus.

A.13.5.5: Describe the indications, contraindications as well as complications and their management of the use of botulinum toxin in strabismus management.

A.13.6: Describe in details the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of the different refractive surgical procedures.

A.13.6.1: Describe the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of the different corneal refractive surgical procedures.

A.13.6.1.1: List the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of radial and astigmatic keratotomy.

A.13.6.1.2: Describe in details the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of the different surface laser ablation procedures.

A.13.6.1.3: Discuss the indications, contraindications and preoperative investigations and preparation and describe with details the principle and technique of LASIK.

A.13.6.1.4: Detail the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of the different customized laser ablation procedures.

A.13.6.1.5: Discuss the indications, contraindications and preoperative investigations and preparation and describe with details the principle and techniques, complications and postoperative care and management of complications of lamellar and penetrating keratoplasty.
A.13.6.2: Describe in details the indications, contraindications and preoperative investigations and preparation and illustrate with details the principles and techniques of the different lenticular surgical procedures.
A.13.6.2.1: To list the indications, contraindications and preoperative investigations and preparation and illustrate with details the principle and technique of refractive lens exchange.
A.13.6.2.2: List the indications, contraindications and preoperative investigations and preparation and illustrate the principles and techniques of phakic implants.
A.13.6.2.3: Elaborate the management of congenital cataract, the indications for cataract surgery in children, the techniques of cataract surgery in children, the indications and contraindications of intraocular lens implantation in children as well as the complications of pediatric cataract surgery.
A.13.6.2.4: Explain the details of the procedures of cataract surgery in adults and apply this knowledge to perform cataract extraction procedures in adults.

A.13.7: Describe the indications, contraindications and preoperative evaluation and illustrate the different surgical techniques as well as the postoperative care and complications and their management of the different vitreo-retinal surgical procedures.
A.13.7.1. List the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of conventional buckling procedures.
A.13.7.2: Detail the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of simple vitrectomy.
A.13.7.3: Detail the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of vitrectomy with retinal detachment and internal tamponade.

A.13.8: List the indications, contraindications and preoperative evaluation and illustrate the different surgical techniques as well as the postoperative care and complications and their management of the different ocular destructive procedures.
A.13.8.1: Describe the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of evisceration.
A.13.8.2: List the indications, contraindications and preoperative evaluation and illustrate the surgical technique as well as the postoperative care and complications and their management of enucleation.
A.13.8.3: Detail the indications, contraindications and preoperative evaluation and demonstrate the surgical technique as well as the postoperative care and complications and their management of excentration.
A.14. OCULAR EMERGENCIES

**Expected year of completion:** 4\(^{th}\) year  
**Assessment:** Log book assessment, part 2 and part 3 exam  
**Description:**  
The candidate should be able to describe in details the different **ocular emergency** conditions  

**A.14.1:** Detail the epidemiology, etiology, clinical picture and differential diagnosis and outline the management of central retinal artery occlusion.  

**A.14.2:** Describe the epidemiology, pathogenesis, clinical picture and differential diagnosis and outline the management of acute angle closure glaucoma.  

**A.14.3:** Detail the epidemiology, causative agents, and clinical picture and outline the immediate and delayed management of chemical eye injuries.  

**A.14.4:** Describe the epidemiology, circumstances, ocular effects, clinical picture and management of the different types of ocular trauma and intra-ocular foreign body.  

**A.14.5:** Discuss in details the epidemiology, etiology, various presentations and their management of the different pictures of rupture globe.

A.15. OCULAR EXAMINATION TECHNIQUES

**Expected year of completion:** 4\(^{th}\) year  
**Assessment:** Log book assessment and part 3 exam  
**Description:**  
The candidate should be able to elaborate on the different **ophthalmic examination techniques** and instrumentation  

**A.15.1:** Describe in details the procedure of anterior segment examination using the slit lamp examination with demonstration of all slit lamp examination techniques.  

**A.15.2:** Detail the procedure of measuring the intraocular pressure using the Goldmann applanation tonometer as well as details of the technique of gonioscopy & anterior chamber angle details.  

**A.15.3:** Describe in detail the use of the auxiliary lenses with the slit lamp to examine the ocular fundus.  

**A.15.4:** Illustrate the techniques of direct and indirect ophthalmoscopy for the examination of the ocular fundus.  

**A.15.5:** Describe the details of assessment of the lacrimal system by the tear break up time and Schirmer tests.  

**A.15.6:** Demonstrate thorough knowledge of the use of flourescein and rose Bengal stains in anterior segment examination.  

**A.15.7:** Describe the technique of eyelid examination as well as the measurement of the degree of ptosis.  

**A.15.8:** Describe the technique of measurement of proptosis by the exophthalmometer.
B. SKILLS

The basic code is as follows:
B.1. Examination and diagnosis skills
B.2. Medical management and surgical skills
B.3. Emergency management skills

B.1. EXAMINATION AND DIAGNOSIS SKILLS

Expected year of completion: 4th year
Assessment: Log book assessment, case presentation and part 3 exam
Description:
The candidate should demonstrate patient care skills including patient interview, examination & ordering required investigations to allow arrival at a diagnosis to allow formulation of a treatment plan

B.1.1: Apply basic knowledge of ocular anatomy and histology to the localization of the lesions in different ophthalmic disease conditions.

B.1.2: Apply basic knowledge of ocular embryology & genetics to the diagnosis of the different congenital abnormalities & chromosomal defects encountered in common ophthalmic practice.

B.1.3: Use basic knowledge of physiology of the eye and vision and the basic biochemistry of the visual system to interpret the different manifestations and complaints of the patients pertaining to ophthalmology.

B.1.4: Interpret the various disease processes and complications encountered by patients on the basis of knowledge acquired in ocular pathology.

B.1.5: Recognize the various ocular infectious diseases conditions based on the knowledge of ocular microbiology.

B.1.6: Skillfully utilize the knowledge of the different ocular examination techniques to conduct a thorough ocular examination of patient's encountered in common ophthalmic practice.
B.1.6.1: Be able to perform strabismus examination techniques namely test for fixation, ductions, versions & vergence, perform cover tests, & measure the angle of strabismus by both corneal reflex & prisms.
B.1.6.2: Interpret the results of worth 4-dot test, Maddox rod & Hess/Lees Test.

B.1.7: Apply the knowledge of the different ocular disease conditions to the diagnosis of the different ocular problems encountered in ophthalmic practice.

B.1.8: Use the knowledge of basic optics & refraction to the diagnosis & management of patient refractive problems.
B.1.8.1: Efficiently perform retinoscopy & determine the state of refraction of the patient’s eye.
B.1.8.2: Prescribe corrective lenses to the patient & perform the process of lens verification after dispensing.
B.1.8.3: Make the necessary calculations for both flexible & rigid gas permeable contact lens dispensing to the patient.
B.1.8.4: Apply the knowledge of basic optics to efficiently use the different lenses for direct & indirect ophthalmoscopy fundus examination.
B.1.8.5: Prescribe the suitable type as well as specifications of appropriate low vision aids as required by the patients visual requirements.
B.2. MEDICAL MANAGEMENT & SURGICAL SKILLS

Expected year of completion: 4th year
Assessment: Log book assessment, case presentation and part 3 exam
Description:
The candidate should demonstrate medical management skills as well as surgical skills that include planning and conducting certain surgical procedures to treat patient diseases and disabilities and improve patient lifestyle.

B.2.1: Apply knowledge of the basic ocular pharmacology to prescribe the necessary medications based on the diagnosis of the patient’s condition to treat patient’s disease.

B.2.2: Use the knowledge of the sensitivities of the different ocular pathogens to prescribe the appropriate the antimicrobial chemotherapeutic agents for the various ocular infectious disease conditions.

B.2.3: Practice various common ophthalmic procedures and operations to treat patient disease conditions.
  B.2.3.1: Efficiently perform the various procedures pertaining to eye lid surgeries and repair.
  B.2.3.2: Demonstrate efficiency in performing common lacrimal procedures such as nasolacrimal duct probing and dacrycystorhinostomy.
  B.2.3.3: Perform efficient repair of various corneal wounds and lacerations.
  B.2.3.4: Perform a standard glaucoma filtering procedure such as a routine trabeculectomy.
  B.2.3.5: Demonstrate marked skill in performance of extracapsular cataract extraction procedures.
  B.2.3.6: Perform efficiently phacoemulsification procedures for lens extraction.
  B.2.3.7: Do conventional retinopexy with application of a scleral buckle to a case of rhegmatogenous retinal detachment.
  B.2.3.8: Be efficient in ocular destructive procedures such as evisceration and enucleation whenever indicated.
  B.2.3.9: Manage procedures as goniotomy and trabeculotomy for the efficient management of pediatric glaucoma.
  B.2.3.10: Efficiently perform recession resection procedures for strabismus management.
  B.2.3.11: Manage vertical muscle surgery for cyclovertical strabismus.
  B.2.3.12: Perform a simple vitrectomy for simple vitreous haemorrhage.
  B.2.3.13: Efficiently perform YAG, Argon and Diode Laser procedures for anterior and posterior segment disorders.

B.3. EMERGENCY MANAGEMENT SKILLS

Expected year of completion: 4th year
Assessment: Log book assessment, case presentation and part 3 exam
Description:
The candidate should demonstrate skills pertaining to ocular emergencies including the first line reception of the patient with an ocular emergency, timely assessment of the condition and institution of appropriate immediate and first aid management of the condition as well as planning and conducting delayed and future procedures pertaining to the ocular emergency.
B.3.1: Be able to perform immediate management of chemical eye injuries with thorough irrigation then investigation and institution of appropriate later treatment.

B.3.2: Be able to timely diagnose cases of central retinal artery occlusion and perform immediate management measures.

B.3.3: Be able to efficiently diagnose and manage cases of acute angle closure glaucoma.

B.3.4: Be able to perform thorough assessment of cases of ocular trauma and provide efficient immediate and delayed treatment measures.

**C. ATTITUDES AND BEHAVIOR**

**Expected year of completion:** 4th year

**Assessment:** Log book assessment, case presentation and part 3 exam

**Description:**

- **C1:** Show appropriate professional attitudes with the patient including empathy, trust worthiness.

- **C.2:** Respect for the dignity, privacy and rights of patients (aware of medical ethics and informed consent).

- **C.3:** Demonstrate a scientific attitude with appreciation of evidence based medicine and be able to use information technology.
SUGGESTED READING LIST

The following publications are suggestions only. The list should be used selectively and is not exhaustive. The following is a list of textbooks that are suitable reading material for the examination. Some of the books require detailed reading, whereas in others only certain sections are directly relevant to the examination. Reference should be made to the examination syllabus in this regard.

Comprehensive Courses:
1. Forrester J, Dick A et al. THE EYE, Basic Sciences in Practice.
   - Volume 1: Update on general medicine
   - Volume 2. Fundamentals and principles of ophthalmology
5. Genetics for Ophthalmologists: The molecular genetic basis of ophthalmic disorders.
   Black GCM. Remedica Publishing 2002
7. MCQ companion to the Eye. Basic Sciences in Practice. Galloway PH, Forrester JV,

Clinical Ophthalmology:

Ophthalmic Surgery: American Academy of Ophthalmology Revision Manuals


Physiology & Biochemistry:
1. Adler. Ocular Physiology.

Clinical Optics:
1. Elkington AR, Frank HJ, Greaney MJ. Clinical Optics.
2. American Academy of Ophthalmology Revision Manuals:
   Volume 3: Optics, Refraction and Contact Lenses.

Pathology & Microbiology:
   DEF. Arnold 2002
Pharmacology:

REFERENCES

The Committees consulted international and regional curricula in Ophthalmology. The external references for the development of this curriculum are:

1. The Ophthalmology curriculum approved by the Joint Committee on Surgery training and the PMETB in 2007

2. Guidelines for curriculum development issued by the Egyptian Fellowship Board April, 2007