

**Government of Odisha
Health & Family Welfare Department**

(DIRECTORATE OF MEDICAL EDUCATION AND TRAINING, ODISHA)

**COURSE CURRICULUM FOR
CERTIFIED OPHTHALMIC ASSISTANT (COA)**

A. GENERAL INFORMATION

(a) After the completion of the course, the trainees will be able to

1. History taking from all patients
2. Measure visual acuity of patients of all ages
3. Read and understand ophthalmic medical records
4. Perform examination of the various structures of the eye
5. Do objective refraction using retinoscope and autorefractor
6. Do subjective refraction using JCC and other supplementary tests
7. Do paediatric refraction
8. Assessment of binocular single vision
9. Assessment of colour vision
10. Assess muscle balance
11. Squint evaluation
12. Able to use various diagnostic ophthalmic instruments
13. A -scan biometry and Keratometry
14. Visual field testing – Bjerrum’s screen, Humphrey Field Analyser
15. Interpret ophthalmic prescriptions
16. Able to write glass prescriptions based on objective and subjective refraction
17. Counseling for spectacles
18. Check order form and prescription for spectacles
19. Check the power of lens
20. Make face measurements using optician’s ruler
21. Do quality checking of spectacles
22. Check frame alignment
23. Dispense spectacles based on the customer needs
24. Provide patients with advice on spectacle frames, lens selection, contact lenses, sunglasses and safety eyewear.
25. Optical dispensing and trouble shooting
26. Do clinical assessment of low vision
27. Provide patients with advice on low vision devices and vision enhancement procedures
28. Able to fit and dispense contact lenses

(b) What knowledge / Theory they should have to perform the above activities

- Basics of eye anatomy & physiology
- Ocular pharmacology
- Ocular diseases
- Orientation to refraction chamber

- Basic Optics
- Visual acuity
- Various ophthalmic instruments
- Refractive errors and management
- Anisometropia, Anisokonia and amblyopia
- Accommodation and its anomalies
- Clinical refraction procedures – supplementary tests
- Basic orthoptics
- Ocular motility and strabismus
- Visual fields
- Contact lens
- Low vision Aids (LVA)
- Dispensing optics
- Basics of medical records

(c) What Practical / Skills they should be imparted?

- i. Model eye practice
- ii. Retinoscopy practice
- iii. Using autorefractometer
- iv. A- scan biometry
- v. Using keratometer, take K readings
- vi. Glass power checking
- vii. Checking of accommodation ,convergence and fusion
- viii. Contact lens fitting, trouble shooting of spectacles

(d) What communication skills they should have?

- i. Properly read the details in the medical record and check the identity of the patient ,the investigations done and the results
- ii. Communicate clearly to the patient for history taking and record the findings properly
- iii. Explain clearly to the patient , the details given in the medical prescription
- iv. Give adequate information about the various diseases
- v. Effectively counsel the importance of follow- up and review
- vi. Explain the after effects of an eye drop/ointment before administering
- vii. Explain clearly the procedures or investigations to be done
- viii. Explain clearly the types of lenses and frames and their uses
- ix. Give clear instructions about the use of spectacles, contact lenses and low vision aids
- x. Give apt answers to patients' queries

B. TRAINING MODALITY

1st Year -	Theory, Practical and Log Book
2nd Year -	Theory, Practical and Log Book

C. BASIC SUBJECTS

FIRST YEAR	
Paper I	<ul style="list-style-type: none"> • Ocular Anatomy, • Ocular Physiology, • Ocular Pharmacology, • Ocular Microbiology & clinical pathology
Paper II	<ul style="list-style-type: none"> • Ocular Diseases I, • Outpatient Procedures I • In-patient Procedures I • Visual Optics, Refractive errors, • Community ophthalmology, • Medical records
Computer (DCA Level) and Communication Skill	
SECOND YEAR	
Paper I	<ul style="list-style-type: none"> • Ocular diseases II, • Optical instruments, • Outpatient Procedures II • In-patient Procedures II • OP investigations and • Refractive surgeries • Ocular injuries and emergencies
Paper II	<ul style="list-style-type: none"> • Refraction techniques, • Contact lenses, • Low vision aids , and • Optical dispensing

D. EXAMINATION PATTERN

1st Year -Internal Assessment (Half Yearly), Theory, Practical

2nd Year -Internal Assessment (Half Yearly), Theory, Practical & Viva by External

FIRST YEAR

Paper	Subject Title	Internal Assessment		Board Exam - Theory	
		Theory (20), Practical (20), Log Book (10)		FM	Pass Mark
				FM	Pass Mark
Paper I	Ocular Anatomy, Ocular Physiology, Ocular Pharmacology , Ocular microbiology& clinical pathology	50	25	100	50
Paper II	Ocular diseases I, Visual optics, Refractive errors, Outpatient Procedures I Community ophthalmology, Medical records	50	25	100	50

SECOND YEAR

Paper	Subject Title	Internal Assessment		Board Exam		Board Exam		Board Exam	
		Theory (20), Practical (20), Log Book (10)		Theory		Practical		Viva	
		FM	Pass Mark	FM	Pass Mark	FM	Pass Mark	FM	Pass Mark
Paper I	Ocular diseases II, Optical instruments, Outpatient Procedures II In-patient Procedures II OP investigations and Refractive surgeries Ocular injuries and emergencies	50	25	100	50	50	25	50	25
Paper II	Refraction techniques, Contact lenses, Low vision aids , and Optical dispensing	50	25	100	50				

E. DETAIL SYLLABI

FIRST YEAR

Paper 1

(Ocular Anatomy, Ocular Physiology, Ocular Pharmacology, Ocular Microbiology and clinical pathology)

Hours: 60

Max. Mark: 100
(Each unit 20 marks)

Objectives:

The trainee will be able to

1. Understand the anatomy of the different parts of the eye and the diseases affecting them
2. Understand the physiological activities of the different parts of the eye and how to assess them
3. Identify the different ocular medicines and understand their uses and method of application
4. Know the various microorganisms causing infection and the types of infection caused
5. Understand the different infection control methods and principles of asepsis and sterilization

Unit I: Ocular anatomy I

Specific objectives:

- To have a knowledge of ocular anatomy
- To understand the various structures in the eye
- Common diseases affecting them

Gross anatomy of the eyeball – the conjunctiva, the cornea, the sclera, the limbus – chambers of eye - angle of the anterior chamber – the iris and pupil – the ciliary body – the choroid – the crystalline lens

Unit II: Ocular anatomy II

Specific objectives:

- To have a knowledge of ocular anatomy
- To understand the various structures in the eye
- Common diseases affecting them

The retina – Vitreous - Optic Nerve – Visual pathway - the extra ocular muscles – the eyelids – the lacrimal apparatus – the bony orbit – blood supply of the eye – nerve supply of the eye

Unit III: Ocular physiology:

Specific objectives:

- To know the basics of ocular physiology
- To understand the function of various structures in the eye.
- Common tests to assess the ocular functions

The cornea – the lens – tears –the Schirmer's test- the aqueous humor – measurement of IOP –assessment of visual acuity - visual perceptions –colour vision – the visual pathway – pupillary pathways and reflexes -accommodation - ocular movements - binocular single vision

Unit IV: Ocular pharmacology

Specific objectives:

- To know about the ophthalmic medications
- To know the actions and adverse effects of drugs.
- To monitor the patients after the administration of drugs

Drug delivery system – astringents and decongestants – antibiotics – antivirals – antifungal – autonomic drugs – mydriatics and cycloplegics – local anesthetics – ocular hypotensives – corticosteroids – non steroidal anti- inflammatory drugs – viscoelastic substances – ocular reactions to systemic medications –preservatives in eye drops

Unit V: Microbiology & Clinical pathology

Specific objectives:

- To discuss the characteristics of microorganisms including bacterial, viral and fungal infections.
- To discuss the measures to control the spread of micro organisms

Bacteria- classification of bacteria- Gram positive and negative cocci- Gram positive and negative bacilli –fungi – viruses – parasites - smear preparation – gram- staining procedure – sterilization, disinfection and antisepsis - dry heat – moist heat – autoclave - gas sterilization - chemical sterilization – important principles of asepsis

Blood and its components, Estimation of blood sugar/ Albumin, Examination of Urine

FIRST YEAR

Paper 2

(Ocular diseases I, Outpatient Procedures I, In-patient Procedures I, Visual optics, Refractive errors, Community ophthalmology, Medical records)

Hours: 80

Max. Mark: 100
(Each unit 20 marks)

Objectives:

The trainee will be able

- To have knowledge of the various ocular diseases and disorders.
- To know about the signs and symptoms of various ocular diseases.
- To understand the various refractive errors
- To know the various treatment modalities
- To understand the basics of medical records
- To know the basics of community ophthalmology

Unit I Diseases of the eyelid, conjunctiva and diseases of the lacrimal apparatus

Specific objectives:

- To discuss the various diseases and disorders of the lid and conjunctiva
- To know about the signs and symptoms of various diseases and disorders of the lid and conjunctiva
- To know the various treatment modalities

Lids :Entropion– ectropion – trichiasis – ptosis – blepharitis –hordeolum – chalazion – important tumors

Lacrimal apparatus: Diseases of the lacrimal gland – the dry eye syndrome – watering from the eye –dacryocystitis

Conjunctiva: Different types of conjunctivitis – trachoma – Pterygium – Pingaecula – Bitot's spots

Unit II: Diseases of the cornea and lens

Specific objectives:

- To discuss the various diseases and disorders of the cornea and , lens
- To know about the signs and symptoms of various diseases and disorders of the cornea and lens
- To know the various treatment modalities

Cornea : Inflammation of the cornea – bacterial keratitis – mycotic keratitis – fungal keratitis - viral keratitis – peripheral keratitis – interstitial keratitis – corneal dystrophies- scleritis–Episcleritis

Lens: Cataract – subluxation of the lens – dislocation of the lens – Management of cataract – Intraocular lenses – Posterior capsular opacification

Unit III: Outpatient Procedures I

Specific objectives

- To know the basic functions of outpatient department To understand the preliminary examinations done in OPD
- To discuss pre and post operative care given to the respective patients

Orientation to out-patient services: patient reception – instrument, equipment and supplies - communication with patients – departmental structure and function

Fundamentals of outpatient services: History taking – external examination of the eye – visual acuity– measuring intraocular pressure – evaluation of the patency of lacrimal drainage apparatus

Management strategies in out-patient services: public relations- Patient care and patient satisfaction – patient counselling

Preoperative Ophthalmic Care: Preoperative evaluation – preoperative preparation and instructions – day care surgery procedure- biometry

Postoperative ophthalmic care: Preparation of dressing – identification and management of post operative complications –post operative patient counselling

Unit IV: Visual optics

Specific objectives

- To understand human eye as an optical system
- To understand the basic principles of refraction and the properties of different optical elements

Light and electromagnetic spectrum – basic optical principles of human eye - properties of light – regular and diffuse reflection- interference- diffraction – laws of reflection and refraction,- refractive index - refractive index of different media – variation of refractive index with wavelength - spherical lenses – different types - identification – refraction of light through a lens - power of a lens – formation of images using a lens (convex and concave) – characteristics of images – real, virtual – magnification- image formation by a prism – power of prism- types of prisms and their uses

Unit V. Refractive errors and their management

Specific objectives

- To understand the different types of refractive errors
- To understand the management of different types of refractive errors

Myopia – hypermetropia – astigmatism – presbyopia – anisometropia – aniseikonia – amblyopia - asthenopia – anomalies of accommodation and convergence

Community ophthalmology and medical records

Specific objectives:

- To understand the different categories of visual impairment
- To understand the different methods of intervention
- To appreciate the need for eye donation
- To know the basics of organizing eye camps

Blindness – categories of visual impairment –Magnitude – Various diseases causing blindness - methods of intervention –nutritional blindness - National program for control of blindness - vision 2020 – the right to sight initiative – human resource development – role of camps in blindness prevention- role of eye banks in blindness prevention.
Planning and organisation of School sight programme and community eye care programmes

Medical records:

Specific objectives:

- To know the use and importance of medical records
- To be familiar with different types of medical records
- To understand the filing methods and preservation of medical records

Introduction to Medical Records; - use and value of for medical record - content of medical records-out patient record, inpatient admission record- filing methods– preservation of medical records- medical record retention policy

Communication skills

Essentials of good communication– barriers of communication – overcoming communication barriers – principles of communication -7cs- types of communication

Oral communication

Importance of speaking efficiently –voice culture - preparation of speech - secrets of good delivery – audience psychology – presentation skills –non-verbal communication – interview techniques – skill in arguing

Spoken English & reading

The phonetic symbols- using the dictionary for learning to pronounce – explaining clearly, defining and giving reasons, explaining differences – efficient and fast reading – reading purposefully – understanding what is read – drawing conclusion – improving speed – improving concentration

Written communication

Rules for effective writing – précis writing - letter writing – writing curriculum vitae – placing an order – preparing a good report – note taking – reporting what happened from notes

SECOND YEAR

Paper 1

(Refractive Techniques, Contact Lenses, Low Vision Devices, Optical Dispensing)

Hours: 80

Max. Mark: 100
(Each unit carries 20 marks)

General objectives

- To understand the various refractive techniques
- To understand the practice of contact lens fitting
- To understand low vision management
- To understand the working principles of different optical instruments

Unit I: Refractive techniques- I

Specific objectives:

- To understand the different techniques of refraction
- To understand objective refraction

Visual acuity – different charts - Objective refraction – retinoscope – plane mirror and streak - their description and use -use of retinoscope in refraction - in myopic, hyperopic, astigmatic eyes - explanation of ‘ with ‘ and ‘ against’ motions in retinoscopy - plane and concave mirror - spherical aberration- chromatic aberration- cylindrical lens – power - crossed cylinder – spherical equivalent – notation of spherical lens- sphero cylindrical lens – strums conoid

Unit II Refractive techniques II

Specific objectives:

- To understand subjective refraction
- To understand the different techniques

Subjective refraction –cycloplegic refraction – PMT – duochrome – JCC – presbyopic correction - prescription of glasses - writing down prescription -spherical equivalent - transposition - specification of axis – determination of muscle balance – vision testing in children -Keratometry - A scan -- visual fields- corneal topography - intraocular lenses – different types

Unit III: Contact lens

Specific objectives:

- To understand the fitting procedures and deal with complications

Indications - advantages over spectacles - optics of contact lenses – corneal contact lens – fitting procedures – contact lens related terminologies –indications and contraindications- maintenance.

Assessment of soft contact lens fitting - determination of contact lens power -contact lens solutions - complications of using CL -toric, cosmetic and therapeutic lenses.

Contact lens care – Instructions to patients

Unit IV: Low Vision Aids

Specific objectives:

- To understand the concept of low vision,

- To understand the working principle of different low vision aids and their uses
- To be familiar with low vision management

Definition of blindness and low vision- legal blindness-low vision devices and aids- types of charts- principle and use - optical, non-optical low vision aids and their principles- artificial eye- special techniques for problems of low vision – rehabilitation measures

Unit V: Optical Dispensing

Specific objective:

- To understand the different types of lenses and frames
- To become familiar with various types of coating and their uses
- To solve the problems in the spectacles by proper troubleshooting

Lens types: single vision lens. Bi-focal lenses, multifocal -trifocal, progressive lenses- lens materials-glass, plastic, polycarbonate- lens surfacing - ophthalmic lens coating,- absorptive lenses,-impact resistant lenses- lenses for the aphakic patient- aspheric lenses -inspection of lens quality - spectacle frame: materials (plastics, metals) ,types - frame measurements- the boxing system- the datum system -facial measurement: the IPD,-visual axes,-measuring heights: Single vision, bi -focal, progressive- trouble shooting

SECOND YEAR

Paper 2

(Ocular Diseases II, Optical Instruments, Outpatient Procedures II, Out Patient Investigations & Refractive Surgeries, ocular injuries and emergencies)

Hours: 80

Max. Mark: 100
(Each unit carries 20 marks)

General objectives

- To discuss the various ocular diseases and disorders.
- To know about the signs and symptoms of various ocular diseases.
- To know the various treatment modalities
- To know the working principles of different optical instruments
- To understand the basics of different refractive surgeries

Unit I: Diseases of the uvea and various glaucoma, ocular motility and strabismus

Specific objectives:

- To discuss the various diseases and disorders of the uvea
- To know about the signs and symptoms of various diseases and disorders of the uvea
- To know the signs and symptoms of different types of glaucoma
- To know the various treatment modalities

Uvea: Anterior uveitis – parsplanitis – posterior uveitis – AIDS – endophthalmitis, panophthalmitis

Glaucoma: Intraocular pressure – congenital glaucoma – primary angle closure glaucoma – primary open-angle glaucoma – secondary glaucomas

Ocular motility and strabismus

Unit II: Diseases of the retina, vitreous & optic nerve, Intraocular tumours, diseases of the orbit
Specific objectives:

- To discuss the various diseases and disorders of the retina, vitreous and optic nerve, orbit and lacrimal apparatus
- To know about the signs and symptoms of various diseases and disorders of the retina and optic nerve, orbit and lacrimal apparatus and various types of intraocular tumors
- To know the various treatment modalities

Retina: Vascular disorders – age-related macular degeneration – retinitis pigmentosa – retinal detachment – hypertensive retinopathy – diabetic retinopathy

Vitreous: vitreous opacities – vitreous haemorrhage – vitrectomy

Optic nerve: Developmental abnormalities – optic neuritis – Papilloedema – optic atrophy

Tumours: Leucocoria in children – retinoblastoma- melanoma of the choroid **Orbit:** Proptosis - orbital inflammation – thyroid ophthalmopathy – optic nerve tumours - Injuries

Unit III: Optical instruments
Specific objectives :

- To describe the different ophthalmic instruments
- To use the ophthalmic instruments appropriately
- To Interpret the results of various measurements

Snellen's Charts - Distant vision charts, near vision chart - Lensometer – Retinoscope – Autorefractometer -Slit lamp biomicroscope–Ophthalmoscope (direct & indirect) – Keratometer - Biometry Instruments- Prism bar - RAF ruler

Unit IV: Outpatient Procedures II
Specific objectives:

- To know various diagnostic procedures conducted in the OPD.
- To discuss treatment modalities and management procedures for different ocular conditions.
- To know how to assist surgeons in various investigations and procedures

Out-patient services

Laser in ophthalmology – fundus fluorescein angiography - ultrasonography in ophthalmology – ultrasound bio microscopy - corneal topography – optical coherence tomography

Assisting in special procedures: corneal scraping – fundus fluorescein angiography – ultrasonography –corneal topography - assisting in incision and drainage of abscesses - assisting in fitting a prosthetic eye – laser capsulotomy – NdYag peripheral iridotomy

Unit V: OP investigations &Refractive surgeries
Specific objectives:

- To understand the principles of various investigations
- To understand the principles of various refractive surgeries

Laser in ophthalmology – fundus fluorescein angiography - ultrasonography in ophthalmology – ultrasound bio microscopy - corneal topography – optical coherence tomography - – laser capsulotomy – NdYag peripheral iridotomy (only principle and procedure)- Preoperative evaluation of the patient – refractive surgeries for myopia, hypermetropia, astigmatism(only principle and procedure)

Ocular injuries and ocular emergencies

Specific objectives:

- To know about the emergency care
- To identify the ophthalmic emergencies
- To identify different types of injuries
- To give timely intervention and care

Ocular injuries: Chemical injuries (Acid, Alkali) -Penetrating injury / perforating injury,- foreign body - blunt injuries-

Ocular emergencies: Corneal emergencies - postoperative emergencies – Endophthalmitis-retinal emergencies – traumatic optic neuropathy-acute congestive glaucoma – immediate treatment measures-

F. SUGGESTED MODE OF TEACHING AND EXAMINATION FOR ALL COURSES

- Lectures
- Skill sessions
- Power point presentations
- Assignments
- Hands-on practice

G. SUGGESTED ACTIVITIES FOR EVALUATION

- Written examinations
- Skill evaluation
- Viva examinations
- Seminar by the students

H. SUGGESTED QUESTION PATTERN FOR HALF YEARLY INTERNAL ASSESSMENT

Number of Multiple choice questions = 40

Number of Short answer questions = 5

Number of Long answer questions = 4

I. REFERENCE BOOKS

- **Samar K. Basak, Essentials of ophthalmology , Current Books International,5th edition**
- **A.K.Khurana, Theory and practice of Optics and refraction, Elsevier, 2nd edition**
- **A text book on optics and refraction , Aravind eye care system**
- **Optical sales and dispensing – a practical guide, Aravind**
- **Ophthalmic Assistants (Series) – Prof L.P. Agarwal**
- **Ophthalmic Assistants – Prof P.K. Mukherjee**
