THE TAMIL NADU Dr. MGR MEDICAL UNIVESITY, CHENNAI 600 03**2**

Diploma in Optometry Technology

Course Guidelines and Frame work

Eligibility	12thStandard, preferably Science Pass 17 – 40 yrs
Gender	Male , Female
Duration	2 Yrs
Eye Centre	
No of Opthalmic OT	2
External Tie-up	Nil
Maximum Student Intake	30 students
Medical College	Medical Colleges affiliated to the Tamil Nadu Dr. MGR Medical University can start this course with maximum student intake of 30
Class room(25x10sq ft)	2
Multimedia	LCD Projector, Computers
Library	500sq.ft,200books,provision for Internet
Teaching responsibility	Ophthalmologist -Designated Course Director
Faculty	**Full time lecturers** Opthalmologists - 2, **Full time Tutors** Optometrists - 2
Training Modality	
1st Year	Theory , Practical and Log Book
2nd Year	Theory ,Practical and Log Book
Examinations	
1st Year	Theory
2nd Year	Theory, Practical & Viva –External

FEE	
University Affiliation fee	
Security deposit	
Inspection fee	
Inspection duration	
Registration University fee	

DIPLOMA IN OPTOMETRY TECHNOLOGY

FIRST YEAR

	Subject
Paper – I	**Ocular Anatomy, Ocular Physiology, Ocular Pharmacology , Ocular microbiology**
Paper -II	**Ocular diseases I, visual optics, refractive errors, community ophthalmology, medical records**
Paper III	**Basic English**

EXAMINATION PATTERN

FIRST YEAR

Sl. No.	**Subject Title**	**I A**		**University Exam**	
		Max	**Min**	**Max**	**Min**
1.	**Ocular Anatomy, Ocular Physiology, Ocular Pharmacology , Ocular microbiology**	50	25	100	50
2	**Ocular diseases I, visual optics, refractive errors, community ophthalmology, medical records**	50	25	100	50
3	**Basic English (Internal)**	50	25	100	50

SECOND YEAR

	Subject
Paper – I	**Refraction techniques, contact lenses, low vision aids , and optical dispensing**
Paper – II	**Ocular diseases II, optical instruments, OP investigations and refractive surgeries**

EXAMINATION PATTERN

SECOND YEAR

Sl. No.	Subject Title	IA		University Exam.		Practical	
		Max	Min	Max	Min	Max	Min
1.	**Refraction techniques, contact lenses, low vision aids and optical dispensing**	50	25	100	50	100	50
2	**Ocular diseases II, optical instruments, OP investigations & refractive surgeries**	50	25	100	50	Nil	Nil

GENERAL INFORMATION

DIPLOMA IN OPTOMETRY TECHNOLOGY

1. **With whom (Physician/ Surgeon) they will work?**
   The Ophthalmologist

2. **What kind of patients / disorders they will be involved in assisting?**
   - Patients with ocular diseases and refractive errors of all age groups

3. **What kind of work they will do (job description)?**
   - History taking
   - Checking Visual acuity
   - Assessing Binocular single vision
   - Assessing Colour vision
   - Examination of anterior segment
   - Objective refraction by Retinoscopy& Auto refractor
   - Subjective refraction
   - Peadiatric refraction
   - Instillation of eye drops for dilatation
   - Glass prescription
   - Checking muscle balance
   - A-scan biometry and Keratometry
   - Visual field testing – Bjerrum's screen, Humphrey Field Analyser
   - Assessment of squint
   - Prescription of contact lens and training in usage
   - Assessment of low vision
   - Prescription of low vision devices and Low vision aids
   - Simple investigative procedures in ophthalmic evaluation
   - Optical dispensing and trouble shooting

4. **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

5. What Practical / Skills they should be imparted?

- Model eye practice
- Retinoscopy practice
- Using autorefractomenter
- A-scan biometry
- Using keratometer, take K readings
- Glass power checking
- Checking of accommodation ,convergence and fusion
- Contact lens fitting, trouble shooting of spectacles

6. What communication skills they should have?

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

SYLLABUS FOR DIPLOMA IN OPTOMETRY TECHNOLOGY

Year 1

Paper 1

Ocular anatomy, ocular physiology, ocular pharmacology ,ocular microbiology

Hours: 60 **Max: 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 ad 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 – angle of the anterior chamber – the iris and pupil – the ciliary body – the choroid – the crystalline lens -chambers of the eye

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 – antifungals – 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

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

Paper II

Ocular diseases I, Visual optics, Refractive errors, Community ophthalmology, Medical records

Hours: 80 **Max: 100**

Each unit 20 marks

General objectives

- 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: 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 IV. 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

Unit V. Community ophthalmology and medical records

Community ophthalmology

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

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

Paper 3

FUNCTIONAL ENGLISH

Hours: 30 **Max: 100**

Each unit carries 20 marks

General objectives:

- To improve comprehensive and writing skills in English
- To discuss about effective communication skills
- To prevent barriers in communication.

Unit I:Grammar in usage

Verbs, tenses, propositions, phrasal words, components of a sentence, positive and negative statements- interrogative statements – parts of speech, transformation and synthesis of sentences, voice, common errors and how to avoid them

Unit II: Communication skills

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

Unit III: 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

Unit IV: 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

UNIT V: 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

Year II

Paper 1

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

Hours: 80 **Max: 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 different types of contact lenses and fitting procedures
- To understand the fitting procedures and deal with complications

Indications - advantages over spectacles - optics of contact lenses – scleral contact lens - semi scleral contact lens – corneal contact lens – fitting procedures – contact lens related terminologies –indications and contraindications- -maintenance
Assessment of soft contact lens fitting - assessment of rigid contact lens fitting - determination of contact lens power -– contact lens solutions - complications of using CL - toric, cosmetic and therapeutic lenses

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

<u>Paper 2:</u> Ocular diseases II, Optical instruments, OP investigations & Refractive surgeries

Hours: 80 **Max: 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

Specific objectives:

- To discuss the various diseases and disorders of the retina, vitreous and optic nerve
- To know about the signs and symptoms of various diseases and disorders of the retina and optic nerve
- 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

Unit III: Intraocular tumors, diseases of the orbit ,

Specific objectives:

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

Tumours: Leucocoria in children - retinoblastoma- melanoma of the choroid

Orbit: Proptosis - orbital inflammation – thyroid ophthalmopathy – optic nerve tumours - Injuries

Unit IV : 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 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)

Suggested mode of teaching for all courses

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

Suggested activities for Evaluation

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

Skill development - I YEAR

1. History taking
2. Visual acuity
3. Torch light examination of anterior segment
4. Objective refraction
5. Do objective refraction using Auto refractometer
6. Subjective refraction
7. Prescription writing
8. Fields checking
9. Medical records reading
10. Checking the order form and prescription
11. Spectacle lens power checking
12. Face measurement by optician's ruler
13. Frame alignment checking
14. Cleaning procedures

Skill development – II YEAR

1. Spectacle counselling
2. Contact lens dispensing
3. Training in the use of contact lens
4. Clinical assessment of low vision
5. Dispensing low vision aids
6. Visual acuity testing in children (different types of charts)
7. Subjective refraction in children
8. Checking muscle balance
9. Checking binocular single vision
10. Squint evaluation and documentation
11. Doing A scan for biometry
12. Using Keratometer to measure K values
13. Using Lensometer to check the power of the lens

Internal assessment:

1. Theory (20)
2. Log Book (10)
3. Practical (20)

Question paper pattern:

OUTCOME OF THE COURSE

After the completion of the course, the trainees will be able to

1. Measure visual acuity of patients of all ages
2. Read and understand medical records
3. Perform examination of the various structures of the eye
4. Do objective refraction using retinoscope and autorefractor
5. Do subjective refraction using JCC and other supplementary tests
6. Do pediatric refraction
7. Assessment of binocular vision
8. Assessment of colour vision
9. Assess muscle balance
10. Squint evaluation
11. Able to use various diagnostic ophthalmic instruments
12. Interpret ophthalmic prescriptions
13. Able to write prescriptions based on objective and subjective refraction
14. Counseling for spectacles
15. Check order form and prescription for spectacles
16. Check the power of lens
17. Make face measurements using optician's ruler
18. Do quality checking of spectacles
19. Check frame alignment
20. Dispense spectacles based on the customer needs
21. Provide patients with advice on spectacle frames, lens selection, contact lenses, sunglasses and safety eyewear.
22. Do clinical assessment of low vision
23. Provide patients with advice on low vision devices and vision enhancement procedures
24. Able to fit and dispense contact lenses

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 eye care system**