ALAGAPPA UNIVERSITY

(Accredited with A+ Grade by NAAC (CGPA: 3.64) in the Third Cycle), Graded as Category-I University and granted autonomy by MHRD-UGC)

DIRECTORATE OF COLLABORATIVE PROGRAMMES

Diploma in Ophthalmic Technique

Regulations and Syllabus

[For those who join the Course in July 2023 and after]

CHOICE BASED CREDIT SYSTEM

GENERAL INSTRUCTIONS AND REGULATIONS

Diploma in Ophthalmic Technique conducted by Alagappa University, Karaikudi, Tamil Nadu through its Collaborative Institution _____ at _____.

Applicable to all the candidates admitted from the Academic year **2023** onwards.

1. **Eligibility:**

   A pass in **HSC** or Equivalent preferable with **Biology or Botany or Zoology** by the Syndicate for admission to **Diploma in Ophthalmic Technique**.

2. **Admission:**

Admission is based on the marks in the qualifying examination.

3. **Duration of the course:**

   The course shall extend over a period of **two years** under **semester pattern.**

4. **Standard of Passing and Award of Division:**
   a. Students shall have a minimum of 40% of total marks of the University examinations in each subject. The overall passing minimum is 40% both in external and aggregate of Continuous Internal Assessment and external in each subject.
   b. The minimum marks for passing in each theory / Lab course shall be 40% of the marks prescribed for the paper / lab.
   c. A candidate who secures 40% or more marks but less than 50% of the aggregate marks prescribed for two years taken together, shall be awarded **THIRD CLASS.**
   d. A candidate who secures 40% or more marks but less than 60% of the aggregate marks prescribed for two years taken together, shall be awarded **SECOND CLASS.**
   e. A candidate who secures 60% or more of the aggregate marks prescribed for two years taken together, shall be awarded **FIRST CLASS.**
   f. The Practical / Project shall be assessed by the two examiners, by an internal examiner and an external examiner.

5. **Continuous internal Assessment:**
   a. Continuous Internal Assessment for each paper shall be by means of Written Tests, Assignments, Class tests and Seminars
   b. **25 marks** allotted for the Continuous Internal assessment is distributed for Written Test, Assignment, Class test and Seminars.
   c. Two Internal Tests of 2 hours duration may be conducted during the semester for each course / subject and the best marks may be considered and one Model Examination will be conducted at the end of the semester prior to University examination. Students may be asked to submit at least five assignments in each subject. They should also participate in Seminars conducted for each subject and marks allocated accordingly.
   d. Conduct of the continuous internal assessment shall be the responsibility of the concerned faculty.
   e. The continuous internal assessment marks are to be submitted to the University at the end of every year.
   f. The valued answer papers/assignments should be given to the students after the valuation is over and they should be asked to check up and satisfy themselves about the marks they have scored.
   g. All mark lists and other records connected with the continuous internal assessments should be in the safe custody of the institution for at least one year after the assessment.

6. **Attendance:**

Students must have earned 75% of attendance in each course for appearing for the examination.

Students who have earned 74% to 70% of attendance to be applied for condonation in the prescribed form with the prescribed fee.

Students who have earned 69% to 60% of attendance to be applied for condonation in the prescribed form with the prescribed fee along with the medical certificate.

Students who have below 60% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme.

7. **Examination:**

Candidate must complete course duration to appear for the university examination. Examination will be conducted with concurrence of Controller of Examinations as per the Alagappa University regulations. **University may send the representatives as the observer during examinations.** University Examination will be held at the end of the each semester for duration of 3 hours for each subject. Certificate will be issued as per the AU regulations. **Hall ticket will be issued to the 1st year candidates and upon submission of the list of enrolled students along with the prescribed course fee subsequent 2nd year hall tickets will be issued.**

8. **Question Paper pattern:**

Maximum: 75 Marks	Duration: 3Hours
Part A - Short answer questions with no choice	: 10 x 02=20
Part B – Brief answer with either or type	: 05 x 05=25
Part C- Essay – type questions of either / or type	: 03 x 10=30

9. **Miscellaneous**

a. Each student posses the prescribed text books for the subject and the workshop tools as required for theory and practical classes.
b. Each student is issued with an identity card by the University to identify his / her admission to the course
c. Students are provided library and internet facilities for development of their `studies.
d. Students are to maintain the record of practicals conducted in the respective laboratory in a separate Practical Record Book and the same will have to be presented for review by the University examiner.
e. Students who successful complete the course within the stipulated period will be awarded the degree by the University.

10. **Fee structure**

Course fee shall be as prescribed by the University and 50% of the course fee should be disbursed to University. Special fees and other fees shall be as prescribed by the Institution and the fees structure must intimated to the University. Course fees should be only by Demand draft / NEFT and AU has right to revise the fees accordingly.

Non-semester Pattern

Examination	Course Fee payment deadline
April / May	Fee must be paid before 30th October of the academic year

11. **Other Regulations:**

Besides the above, the common regulation of the University shall also be applicable to this programme.

DIPLOMA IN OPHTHALMIC TECHNIQUE
PROGRAMME STRUCTURE

SEM	Courses	Course Code	Title of the Paper	T/P	Cr.	Hrs./ Week	Max. Marks		
							Int.	Ext.	Total
Sem - I	CC	93311	Ocular Anatomy and Physiology	T	4	5	25	75	100
	CC	93312	Physical, Geometrical Optics & Visual Optics	T	4	5	25	75	100
	CC	93313	Practical – I	P	5	10	25	75	100
	CC	93314	Practical – II	P	5	10	25	75	100
		Total			**18**	**30**	**100**	**300**	**400**
Sem - II	CC	93321	Microbiology, Pathology & Pharmacology	T	4	5	25	75	100
	CC	93322	Optometric Instruments	T	4	5	25	75	100
	CC	93323	Practical – III	P	5	10	25	75	100
	CC	93324	Practical –IV	P	5	10	25	75	100
			Total		**18**	**30**	**100**	**300**	**400**
Sem - III	CC	93331	Clinical Ophthalmology	T	4	5	25	75	100
	CC	93332	Optometric Optics, Contact Lens & Low Vision Aids	T	4	5	25	75	100
	CC	93333	Practical – V	P	5	10	25	75	100
	CC	93334	Practical – VI	P	5	10	25	75	100
			Total		**18**	**30**	**100**	**300**	**400**
Sem - IV	CC	93341	Internship & Viva Voce	I	10	18	25	75	100
	CC	93342	Project	PR	8	12	25	75	100
			Total		**18**	**30**	**100**	**300**	**400**
Grand Total					**72**	**120**	**400**	**1200**	**1600**

DIPLOMA IN OPTHALMIC TECHNIQUE (2023 Onwards) I-Semester					
Core	**Course code: 93311**	**Ocular Anatomy and Physiology**	**T**	**Credits:4**	**Hours:5**
Pre-requisite	**Basic Knowledge of Ocular Anatomy and Physiology**				
Course Objectives	1. To expertise the students about the basic anatomy and physiology of eye. 2. To update the recent methodologies of studying ocular anatomy and physiology. 3. To familiarize the internal structure and functioning of eye at microscopic level. 4. To cultivate the knowledge about the physiology of eye. 5. To educate about binocular single vision.				

Unit I	The Lids - Lacrimal system - The Conjunctiva – Cornea –Sclera - Pupil - Anterior Chamber and Angle –- Posterior Chamber – Crystalline Lens.
Unit II	Extra Ocular Muscles – Uvea- Retina - Optic Nerve- Visual pathway
Unit III	Tears - Corneal Transparency - Physiology of Aqueous Humuor - Formation Circulation & drainage - Intra Ocular Pressure..
Unit IV	Accommodation, Actions of Extra ocular muscles - Retina - Physiology - Physiology of Normal vision - Visual acuity- Prerequisites, Procedure and Recording, Colour Vision.
Unit V	Binocular Single Vision - ERG and VEP.

References

A Remington: Clinical Anatomy of the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.

A K Khurana, InduKhurana : Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006.

Related online content (MOOC, Swayam, NPTEL, Websiteetc.)

https://www.britannica.com/science/human-eye

https://www.aao.org/eye-health/anatomy/parts-of-eye

Course Outcomes		**Knowledgel evel**
CO-1	Understanding the fundamental concepts of ocular anatomy and physiology.	K3
CO-2	Discuss extra ocular muscles actions, innervations and visual pathway.	K3
CO-3	Acquire the knowledge about physiology of tear, cornea and aqueous humour.	K4
CO-4	Analyze in detail about mechanism of accommodation and vision.	K4
CO-5	Detailed discussion for understanding binocular single vision, ERG and VEP.	K4

Course designed by Aswathi S R

DIPLOMA IN OPTHALMIC TECHNIQUE (2023 onwards) I-Semester					
Core	**Course code: 93312**	**Physical, Geometrical Optics & Visual Optics**	**T**	**Credits:4**	**Hours: 5**
Pre-requisite	**Basic Knowledge of Optics**				
Course Objectives	1. To understand basic phenomenon in physical optics. 2. To equip the students with a thorough knowledge of refraction through mirrors, lenses and prisms. 3. To learn causes, types and treatment of refractive errors. 4. To enhance the knowledge about clinical examination techniques. 5. To understand the concept of subjective refraction.				
Unit I	**Physical Optics:** Nature of light, Electromagnetic Spectrum, Interference, Diffraction, Polarization, Fluorescence. Laws of refraction - Refractive index - Refractive Index of different media.				
Unit II	**Refraction:** Spherical lenses- Different types identification - refraction of light through a lens - Power of a lens - Formation of images using lenses - Characteristics of images - Real, virtual - Magnification .Cylindrical lens - power - Crossed cylinder - Spherical equivalent-Notation of cylindrical lens, Sphero-cylindrical lenses –sturmsconoid . Measurement of power of lens - Neutral isationmethod - Lensometer (focimeter). Prisms - Path of a ray of light through a prism - Deviation - Power of a prism- prismatic power of a lens - Use of prisms				
Unit III	**Refractive errors:** Myopia, Hypermetropia, Astigmatism, Presbyopia, Aphakia, Pseudophakia, Anisometropia, Aniseikonia, Amblyopia				
Unit IV	**Examination techniques:** Objective Refraction- Retinoscope - Plane mirror - Streak – their description and use -Use of Retinoscope in refraction- in myopic, hyperopic. astigmatic eyes. Explanation of "with" and "against" motions in retinos copy- plane and concave mirror.				
Unit V	Subjective refraction - cycloplegic refraction- PMT - Duochrome- JCC- Binocular Balancing - presbyopic correction - Prescription of glasses - Writing down prescription- spherical equivalent - Transposition - Specification of axis.				

References

Practice of Refraction – Duke elders – Vol III
Optics & Refraction –A.K.Khurana – 3rd edition
Textbook of Optics – Subramanyan&Brijilal – 1st edition

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://www.sciencedirect.com/topics/physics-and-astronomy/geometrical-optics
https://www.animations.physics.unsw.edu.au/light/geometrical-optics/index.html

Course Outcomes		**Knowledge level**
CO-1	Understand nature and properties of light.	K1
CO-2	Construct ray diagrams and evaluating nature and properties of image.	K2
CO-3	Acquire knowledge about types of refractive errors.	K3
CO-4	Discuss objective methods in refraction.	K4
CO-5	Analyze in detail about the steps in subjective refraction.	K4

Course designed by Aswathi S R

DIPLOMA IN OPTHALMIC TECHNIQUE (2023 Onwards)

I-Semester

Core	Course code: 93313	Practical-I	P	Credits:5	Hours:10

Pre-requisite	**Basic Practical Knowledge in Ocular Anatomy and Physiology**
Course Objectives	1. To understand the basics of ocular structures. 2. To learn actions of extra ocular muscle and lesions in visual pathway. 3. To understand aqueous humour circulations and measurement of IOP. 4. To analyze basic clinical examination tests. 5. To gain knowledge in binocular vision assessment.
Unit I	Demonstration of ocular structures.
Unit II	Demonstration of EOM, Visual Pathway lesions.
Unit III	Demonstration of Lacrimal system, Aqueous humour drainage and Measurement of IOP.
Unit IV	NPA, NPC, EOM, Vision Assessment, Colour Vision
Unit V	Cover Test, PBCT, Maddox Rod, W4DT,Steriopsis.

References

Related online content (MOOC, Swayam, NPTEL, Website etc.)

Course Outcomes		**Knowledge level**
CO-1	Gain sufficient knowledge about the basics of ocular structures.	K1
CO-2	Acquire knowledge about actions of extra ocular muscle and lesions in visual pathway.	K2
CO-3	Analyze aqueous hum our circulations and to measure IOP.	K3
CO-4	Develop skills on basic clinical examination tests.	K4
CO-5	Develop skills on binocular vision assessment.	K4

Course designed by Aswathi S R

DIPLOMA IN OPTHALMIC TECHNIQUE (2023 Onwards)					
I-Semester					
Core	**Course code: 93314**	**Practical-II**	**P**	**Credits:5**	**Hours:10**
Pre-requisite	**Basic Practical Knowledge Physical, Geometrical Optics & Visual Optics**				
Course Objectives	1. To equip the students with a profound knowledge of reflection and refraction. 2. To predict the properties of image formed by lenses and prisms and hence helping the student to understand the optics of the eye. 3. To learn methods to identify an optical lens and its power. 4. To enhance the knowledge about Retinoscope. 5. To learn methods of subjective refraction.				

Unit I	Refraction through glass slab - Focal length of mirrors (convex & concave) - Focal length of lenses (convex & concave)
Unit II	Refractive index of material of prism - Refractive index of a transparent liquid (water) using travelling microscope - Liquid lens - measurement of focal length
Unit III	Lens Identification, Neutralization and Transposition.
Unit IV	Retinoscope – Cross and Flash Method
Unit V	Subjective Refraction – Duochrome, JCC and Binocular Balancing

References

Related online content (MOOC, Swayam, NPTEL, Website etc.)

Course Outcomes		**Knowledge level**
CO-1	Discuss refraction through different media.	K1
CO-2	Demonstrate image formed by lenses and prisms.	K1
CO-3	Understand the technique to identify an optical lens and its power	K3
CO-4	Develop skills to perform retinos copy.	K4
CO-5	Develop skills on subjective refraction procedures.	K4

Course designed by Aswathi S R

II - Semester					
Core	**Course code:** 93321	**Microbiology, Pathology & Pharmacology**	**T**	**Credits: 4**	**Hours:5**

Pre-requisite	**Basic Knowledge of microorganism, pathogenesis and pharmacokinetics**
Course Objectives	1. To impart a detailed knowledge on diseases associated with eyes. 2. To explain the science of hematology. 3. To deliver knowledge on the cornea and retina with the associated pathology. 4. To acquire knowledge in commonly used ocular drugs, mechanism, indications, contraindications, drug dosage, and adverse effects. 5. To learn actions, uses adverse effects and mode of administration of drugs for various diseases.
Unit I	**General Introduction:** Inflammation and Repair- Ophthalmic Wound Healing. **Infections:** Tuberculosis – Leprosy - Syphilis – Fungus – Virus – Chlamydia. **Intraocular Tumours:** Retinoblastoma - Choroidal Melanoma – Optic Nerve: Normal and Tumors. **Hematology:** Anemia, Leukemia and Bleeding Disorders - Clinical Pathology - Examination of Urine and Blood Smears. **Eyelid:** Normal and Pathology Including Inflammations and Tumors.
Unit II	**Cornea & Retina:** Normal and Pathology in Degeneration and Dystrophies. **Lens:** Normal and Pathology of Cataract. **Retina:** Normal and Pathology in Inflammatory Disease. **Orbit:** Inflammation and Neoplasia. **Morphology of the bacterial cell:** Growth and Nutrition of Bacteria **-** Cultivation Methods - Identification of Bacteria - Sterilization Disinfection- Antibacterial Agents and Antibiotic Sensitivity Testing. **Basic Immunology**: Bacterial Infections of the Eye-Viral Infections of the eye- Parasitic Infections of the Eye - Fungal Infections of the Eye.
Unit III	**General Pharmacology:** Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics &factor, modifying drug. **Systemic pharmacology:** Drugs affecting pupillary size and light reflex, intraocular tension, Accommodation - General & local anesthetics – Antiviral – antifungal – antibiotics – steroids - Anti-diabetics.
Unit IV	**Ocular Pharmacology:** Ocular preparations, Ocular pharmacokinetics, methods of drug, administration and special drug delivery system, Ocular toxicology.
Unit V	**Diagnostic & Therapeutic applications of drugs used in Ophthalmology:** Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedure Antiglaucoma drugs; Pharmacotherapy of ocular infections – Bacterial, viral, fungal.

References

1. Corton Kumar and Robins: *Pathological Basis of the Disease*, 4th edition, 1994.
2. Harsh Mohan: *Text Book of Pathology*.
3. Burton G R W: *Microbiology for the Health Sciences*, St.Louis, J P Lippincott Co., 3rd ., 1988.
4. *Essentials of Medical Microbiology* by Rajesh Bhatia, Rattan Lal Ichhpujani- Jaypee (latest edition).
5. K D TRIPATHI: *Essentials of Medical Pharmacology*. 5th edition, Jaypee, New Delhi, 2004.
6. Ashok Garg: *Manual of Ocular Therapeutics*, Jaypee, NewDelhi, 1996.

Related online content (MOOC, Swayam , NPTEL, Website etc.)

https://microbenotes.com

https://www.pharmacology2000.com/

Course Outcomes		**Knowledge level**
CO-1	Identify the type of eye tumor and treatment with a thorough knowledge on pathology and microbiology.	K2
CO-2	Apply the knowledge of morphology of bacterial cell in testing the eyes.	K3
CO-3	Understanding the pathology of cataract.	K3
CO-4	Discuss ocular drugs its mechanism, indications, contraindications, drug dosage, and adverse effects.	K4
CO-5	Acquire knowledge about major ocular drugs and its clinical application.	K4

Course designed by **Aswathi S R**

II - Semester					
Core	**Course code:** 93322	**Optometric Instruments**	**T**	**Credits: 4**	**Hours:5**

Pre-requisite	**Basic Knowledge of optometric instruments**
Cours Objectives	1. To illustrate the basic principles, features, merits and demerits of different refractive instruments. 2. To impart knowledge on the design and usage of ophthalmoscopes and other related devices. 3. To demonstrate various orthoptic and ophthalmic instruments and screening devices. 4. To impart knowledge on Ocular symptoms, testing and ophthalmic examination. 5. To provide knowledge on lacrimal and macular examinations.
Unit I	**Trial Set:** Trial Frame & its components, Trial lens & Accessories – Pinhole, Occluder, Stenopaic slit, Maddox rod, Red-Green filters. **Vision Charts:** Distance & Near, Snellen & Log MAR, Pediatric vision charts, Vision drum, Projection charts. **Lensometer:** Manual & Automated lensometer.
Unit II	**Retinoscope:** Spot retinoscope, Streak retinoscope –Autorefractometer. RAF ruler - Prism bar - Cover Test - Maddox rod - Maddox wing – Synoptophore.
Unit III	**Tonometer:** Principles, types, clinical significance. Keratometer - Corneal topography - Slit lamp.
Unit IV	**Dry eye evaluation:** Schimmer's, TBUT, NITBUT, Lacrimal syringing, ROPLAS. Colour Vision testing devices. **Visual Field:** Amslers chart, Bjerrum screen, Automated Perimetry.
Unit V	Ophthalmoscope – Gonioscope - A Scan – B Scan – Pachymeter.

References

1) David B Henson: *Optometric Instrumentation*, Butterworth-Heinemann Ltd (1 December 1982)
2) *Optometric Instrumentation* - Santosh K. Kumar
3) *Primary Care Optometry* - Theoder Grosvenor

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://pubmed.ncbi.nlm.nih.gov/

https://www.aao.org/eye-health

Course Outcomes		**Knowledge level**
CO-1	Understand the various topics related to refractive instruments.	K3
CO-2	Appraise on the results of various vision testing and screening devices.	K4
CO-3	Illustrate on the principles, types and uses of to nometers.	K4
CO-4	Utilize the orthoptic and ophthalmic instruments for ultras onography and electrodiagnostics.	K4
CO-5	Discuss about the design, features and advantages of ophthalmoscope and related devices.	K4

Course designed by **Aswathi S R**

II - Semester					
Core	**Course code:** 93323	**Practical – III**	**P**	**Credits: 5**	**Hours:10**
Pre-requisite	**Basic Practical Knowledge in microbiology, pharmacology & Pathology**				
Course Objectives	1. To familiarize basic information about microbiology and microorganisms. 2. To provide knowledge in ocular bacterial infections. 3. To deliver knowledge on the cornea and retina with the associated pathology. 4. To acquire knowledge in commonly used ocular drugs, mechanism, indications, contraindications, drug dosage, and adverse effects. 5. To acquire the knowledge about ophthalmic drugs.				
Unit I	Demonstration of cultivating bacteria - Sterilization and disinfections in laboratory and hospital practice.				
Unit II	Common bacterial infections of the eye - Common fungal infections of the eye.				
Unit III	Common viral infections of the eye - Common parasitic infections of the eye.				
Unit IV	Routes of drug administration - drugs affecting pupillary size - light reflex, intraocular tension.				
Unit V	Methods of drug administration and special drug delivery system - Anaesthetics used in ophthalmic procedure – Anti-glaucoma drugs.				

Course Outcomes		**Knowledge level**
CO-1	Understand the basic information about microorganisms and microbiology.	K2
CO-2	Discuss about bacterial infections and treatment in ocular aspects.	K2
CO-3	Acquire knowledge of pathogenesis; treatment and prophylaxis of various viral, fungal and parasitic lesions occur in eyes.	K3
CO-4	Acquire knowledge about route of administration of drugs.	K2
CO-5	Understand main classifications of drugs and its clinical application.	K3

Course designed by **Aswathi S R**

II - Semester					
Core	**Course code:** 93324	**Practical – IV**	**P**	**Credits: 5**	**Hours:10**
Pre-requisite	**Basic Practical Knowledge in optometric instruments**				
Course Objectives	1. To train the students on optometric experiments so as to understand the basic concepts. 2. To impart skills on handling refractive instruments. 3. To measure corneal curvature and power. 4. To provide knowledge on testing and screening devices. 5. To acquire knowledge to assess the visual field.				
Unit I	Refractive instruments: Test chart standards -Trial case lenses – Lensometer.				
Unit II	Auto refractors – Retinoscope.				
Unit III	Tonometer – Keratometer – Schirmer's test.				
Unit IV	Colour vision testing devices - Orthoptic Instruments.				
Unit V	Fields of vision and screening devices.				

Course Outcomes		**Knowledge level**
CO-1	Demonstrate the practical skills on optometric instrumentation.	K4
CO-2	Demonstrate objective refraction using retinoscope.	K3
CO-3	Demonstrate IOP, corneal curvature and dry eye assessment.	K3
CO-4	Analyze colour vision deficiency using screening devices and Utilize the orthoptic and ophthalmic instruments.	K4
CO-5	Carry out the tests used to assess visual field defects.	K5

Course designed by **Aswathi S R**

III - Semester					
Core	**Course code:** 93331	**Clinical Ophthalmology**	**T**	**Credits: 4**	**Hours:5**
Pre-requisite	**Basic Knowledge of ocular diseases**				
Course Objectives	1. To impart a detailed knowledge on the anatomy of eyelids, lacrimal system, orbit, cornea, iris and pupil. 2. To explain the functioning of eyes. 3. To provide a better understanding of ophthalmology, with reference to ocular diseases. 4. To deliver knowledge on the different eye trauma associated with its anatomy. 5. To impart knowledge on the anterior and posterior segment trauma and blindness.				
Unit I	**Lids:** Congenital anomalies, Oedema of the eyelids – Inflammatory disorders, Tumors. **Lacrimal System:** Dry eye – The watering eye – Dacryosystitis.				
Unit II	**Cornea:** Congenital anomalies - Inflammations of the cornea – Degenerative conditions of cornea – Dystrophies – Keratoconus – Keratoglobus – Corneal oedema, Corneal opacity – corneal vascularization – Penetrating keratoplasty. **Conjunctiva:** Inflammations of conjunctiva – Degenerative conditions – Symptomatic - conditions – Cyst and Tumors.				
Unit III	**Lens:** Classification of cataract – congenital and developmental cataract – management of cataract – complications of cataract surgery – Displacement of lens – lens coloboma.				
Unit IV	**Uveal Tract & Sclera:** Classifications of uveitis – Tumors of uveal tract – Episcleritis and scleritis – clinical examination of uveitis and scleritis. **Retina & Vitreous:** Congenital and developmental disorders – Inflamatory disorders – Retinal artery and vein occlusions – Mascular disorders – Retinal degenerations –Retinal detachment – Retinoblastoma.				
Unit V	**Neuro – Ophthalmology:** Lesions of visual pathway – Pupillary reflexes and abnormalities – optic atrophy – malingering – nystagmus. **Glaucoma:** Definitions and classifications of glaucoma – congenital glaucoma - ocular hypertension – Primary open angle glaucoma – Normal tension glaucoma – Primary angle closure glaucoma – secondary glaucoma.				

References

1. A K Khurana: *Comprehensive Ophthalmology*, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007.
2. Stephen J. Miller : *Parsons Diseases of the Eye*, 18th edition, Churchill Livingstone, 1990.
3. Jack J. Kanski: Clinical Opthalmology, Butterworths, 2nd Ed., 1989.

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://pubmed.ncbi.nlm.nih.gov/
https://www.cdc.gov/visionhealth/basics/ced/index.html

Course Outcomes		**Knowledge level**
CO-1	Appreciate the knowledge gained on eye anatomy in rectifying the problems in eye vision due to tumours and trauma	K2
CO-2	Analyze on the causes, therapy and drug related to ocular diseases	K3
CO-3	Discuss in detail about the retinal disorder and related diseases	K3
CO-4	Appraise on the anatomy, pathophysiology and aging process	K4
CO-5	Interpret on the background, defects and techniques involved in neuro-ophthalmology	K3

Course designed by **Aswathi S R**

III - Semester					
Core	**Course code:** 93332	**Optometric Optics, Contact Lens & Low Vision Aids**	**T**	**Credits: 4**	**Hours:5**
Pre-requisite	**Basic Knowledge of optical ids**				
Course Objectives	1. To illustrate the types of filters and coatings used in lenses. 2. To demonstrate the mounting of lenses and its proper handling. 3. To provide the suitable knowledge to the student both in theoretical and practical aspects of Contact Lenses. 4. To illustrate knowledge on fitting philosophies and recent development of contact lenses. 5. To train the students to understand the low vision aids through the experiments				
Unit I	**Dispensing Lens type:** Single vision lens, Bi-focal lenses, multifocal -trifocal, progressive lenses. **Lens materials:** glass, plastic, polycarbonate. Lens surfacing. Opthalmic lens coating, Absorptive lenses, Impact resistant lenses, Lenses for the Aphakic patient, Aspheric lenses, Inspection of lens quality.				
Unit II	**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.				
Unit III	**Contact lens:** Definition, Types, Parameters, Indications, Contraindications, Insertion and removal, Do's and Don'ts.				
Unit IV	Pre-fitting assessment, (Keratometry), Fitting, contact lens solutions, complications of using CL. Toric, cosmetic & therapeutic lenses.				
Unit V	**Low Vision Aids:** Definition – Classification –Magnification - Low vision aids-optical, non optical and electronic devices.				

References

1. M. Jalie: *Principles of Ophthalmic Lenses*, Edition 5, 2016
2. C.V. Brooks, IM Borish: *System for Ophthalmic Dispensing*, Second edition, Butterworth-Heinemann, USA, 1996.
3. Robber B Mandell: *Contact lens Practice, hard and flexible lenses*, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA
4. 2. Ruben M Guillon: *Contact lens practice*, 994, 1st Edition
5. *Low Vision AIDS Practice*, 2 nd Edition 2007, Bhootra Ajay,

Related online content (MOOC, Swayam, NPTEL, Website etc.)

https://iacle.org/

https://pubmed.ncbi.nlm.nih.gov/

Course Outcomes		**Knowledge level**
CO-1	Define the properties and characteristics lenses and analyze the effect of anti reflective, anti fog and anti scratch coatings on the lenses.	K4
CO-2	Appraise on the size, shape and mounting of the lenses and design and develop flawless, purpose solving spectacle lenses suitable for the patients.	K3
CO-3	Recognize various type of contact lens fitting and apply the concepts involved in selecting the contact lenses to administer the patients.	K4
CO-4	Hypothesize the contact lens care procedures for the awareness of the patients and demonstrate the instrumentation in contact lens practices.	K4
CO-5	Analyze optical and non-optical measurements for effective understanding of demonstrating aids and describe the concepts and principles determining magnification and low vision aids through practical experiments.	K4

Course designed by **Aswathi S R**

III - Semester					
Core	**Course code:** 93333	**Practical – V**	**P**	**Credits: 5**	**Hours:10**
Pre-requisite	**Basic Practical Knowledge in ocular diseases**				
Course Objectives	1. To provide a better understanding of ophthalmology, with reference to ocular diseases. 2. To acquire knowledge on diagnostic approach, and management of the ocular diseases. 3. To understand pathogenesis of disease and the implications of ocular health and function. 4. To be knowledgeable in ocular and laboratory testing used in the assessment of systemic, visual and ocular function. 5. To understand and identify glaucoma and diseases affecting eyelid, lacrimal apparatus, conjunctiva, cornea, sclera, uveal tissue and lens.				
Unit I	Assessment of lid abnormalities - Stye removal – Dry eye evaluation – Schirmer test, TBUT - Lacrimal syringing.				
Unit II	Conjunctival and Corneal Evaluation – Foreign body removal, Eye Patching, Application of eye drops, eye ointments and Bandage contact lens.				
Unit III	Cataract evaluation – Pre and post surgical assessments.				
Unit IV	Retinal evaluation – Colour vision, Contrast sensitivity, interpretation of FFA and OCT.				
Unit V	Glaucoma evaluation – Angle of anterior chamber, Corneal thickness, IOP evaluation, Visual field assessments, Interpretation of HFA.				

Course Outcomes		**Knowledge level**
CO-1	Understand various ocular diseases affecting various parts of the eyes.	K3
CO-2	Ability to recognize common ocular abnormalities and to refer when appropriate.	K4
CO-3	Ability to interpret and investigate the presenting symptoms of the patient.	K3
CO-4	Ability to recognize common ocular abnormalities and to refer when appropriate.	K4
CO-5	Discuss in detail about the retinal disorder and related diseases.	K4

Course designed by **Aswathi S R**

III - Semester					
Core	**Course code:** 93334	**Practical – VI**	**P**	**Credits: 5**	**Hours:10**

Pre-requisite	**Basic Practical Knowledge in spectacle, contact lens & low vision**
Course Objectives	1. Lens verification and axis marking and fitting of all lens types. 2. Troubleshooting complaints and handling patient's questions. 3. To provide the suitable knowledge to the student both in theoretical and practical aspects of Contact Lenses. 4. To illustrate knowledge on fitting philosophies and recent development of contact lenses. 5. To illustrate the testing the methods of low vision, lens and devices for rehabilitation
Unit I	1. Find out the meridian & optical center of ophthalmic lens. 2. Neutralization – manual & with help of Lensometer. 3. Identification of lens - spherical, cylindrical & sphero-cylindrical lenses. 4. Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification.
Unit II	1. Frame selection: Fashion, Function & standard alignment. 2. Lens selection: Ground rule for selection, selection criteria, 3. Facial measurements: The PD, & measuring inter-Pupillary distance using P.D ruler, Common difficulties in measuring P.D, Measuring monocular P.D.
Unit III	1. Measurement of Ocular dimensions 2. Pupillary diameter and lid characteristics 3. Blink rate and TBUT 4. Schrimer's test, Slit lamp examination of tear layer 5. Keratometry 6. Soft Contact Lens fitting 7. Soft Contact Lens over refraction 8. Lens insertion and removal 9. Lens handling and cleaning
Unit IV	1. RGP Lens parameters 2. RGP Lens fitting 3. Slit lamp examination of Contact Lens wearers 4. RGP Lens Fit Assessment and fluroscein pattern 5. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus) 6. RGP over refraction and Lens flexure 7. Fitting Cosmetic Contact Lens 8. Fitting Toric Contact Lens 9. Bandage Contact Lens
Unit V	1. Attending in low vision care clinic and history taking. 2. Determining the type of telescope and its magnification (Direct comparison method & calculated method) 3. Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers. 4. Inducing visual impairment and prescribing magnification. 5. Determining reading speed with different types of low vision aids with same magnification. 6. Determining reading speed with a low vision aid of different magnifications.

Course Outcomes		**Knowledge level**
CO-1	Explain the special practices in handling the lenses and frames.	K3
CO-2	Analyze various factors involved in the instrumentation for the selection of lenses. Identify and select the right frame designs and fittings for the patients.	K4
CO-3	Recognize various type of contact lens fitting.	K3
CO-4	Hypothesize the contact lens care procedures for the awareness of the patients.	K4
CO-5	Identify the diagnostic procedures in low vision patients and case management.	K4

Course designed by **Aswathi S R**

IV - Semester					
Core	**Course code:** 93341	**Internship & Viva Voce**	**I**	**Credits: 10**	**Hours:18**

IV - Semester					
Core	**Course code:** 93342	**Project**	**PR**	**Credits: 8**	**Hours:12**

Diploma Programme

Passing minimum

- A candidate shall be declared to have passed in each course if he/she secures not less than 40% marks in the End Semester Examinations and 40% marks in the Internal Assessment and not less than 40% in the aggregate, taking Continuous assessment and End Semester Examinations marks together.
- The passing minimum for CIA shall be 40% out of 25 marks (i.e.10 marks) in Theory/ Practical Examinations.
- The passing minimum for University Examinations shall be 40% out of 75 marks (i.e. 30 marks) for Theory /Practical papers.
- The candidates not obtain 40% in the Internal Assessment are permitted to improve their Internal Assessment marks in the subsequent semesters (2 chances will be given) by writing the CIA tests or by submitting assignments.
- Candidates, who have secured the pass marks in the End-Semester Examination and in the CIA but failed to secure the aggregate minimum pass mark (E.S.E + C I.A), are permitted to improve their Internal Assessment mark in the following semester and/or in University examinations.
- A candidate shall be declared to have passed in the Dissertation/Project report/Internship report if he/she gets not less than 40% marks in the Internal Assessment and End Semester Examinations and not less than 40% in the aggregate, taking Continuous assessment and End Semester Examinations marks together.
- A candidate who gets less than 40% in the Dissertation / Internship/ Project Report must resubmit the thesis. Such candidates need to take again the Viva-Voce on the resubmitted report/thesis.