CURRICULUM

Proficiency Certificate Level

Ophthalmic Science

Second and Third year

(Three Year's Programme – Yearly System)

Council for Technical and Vocational Training

Curriculum Development & Equivalency Division

Sanothimi, Bhaktapur

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Council for Technical Education and Vocational Education (CTEVT)
Sanothimi, Bhaktapur

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Introduction

The Government of Nepal has committed to provide the basic health care services for all citizens by establishing a network of services in rural and urban areas. In support of this national goal, the Council for Technical Education and Vocational Training (CTEVT) has been contributing towards the development of different level of health personnel in the country. In this context, CTEVT has been producing Ophthalmic Assistant (Allied Ophthalmic Personnel) to deliver comprehensive eye health services, including (preventive, promotive, curative and rehabilitative to the community.

In the past, this cadre of human resource were used to certify through CTEVT/Skill test department and considered as a vocational training. This kind of certification though was catering the immediate need of eye care programme in the country, the trained ophthalmic assistant has limited horizon to grow and limited career ladder to upgrade themselves. This has contributed for the increasing demand of academic training which will allow them to grow further after completion of this certificate level course. In this context, the CTEVT started certificate level programme leading to degree **'Proficiency Certificate Level in Ophthalmic Science'** to the candidates who successfully complete the requirements as prescribed by the CTEVT.

The trained Ophthalmic Assistant is a professional Ophthalmic Health Worker, who has been given three full years of course in Ophthalmology and related health sciences. This programs aims to produce compassionate middle-level ophthalmic human resources that can help and play important role in eye care services within the hospital and in the community.

The graduates would be eligible for registration with the Nepal Health Professional Council in the category as mentioned in the Act of the Council. The registered graduates would be then eligible for the job at different level health institutions to the position as prescribed by the Public Service Commission or the concerned authority.

Curriculum Title

Proficiency Certificate Level in Ophthalmic Science

Aim

The program aims to educate and train quality middle level ophthalmic health personnel equipped with sound knowledge and skills of Ophthalmology along with general medicine.

Program Objectives

After the completion of this program, the graduates will be enabled to:

- Acquire sound knowledge and perfect skills in Ophthalmology and general medicine.

- Demonstrate competency in identifying and resolving community health problems by applying Ophthalmic and modern procedures and medicines taking into consideration of nature of the diseases and conditions of the patients.
- Demonstrate basic knowledge and clinical skills necessary to diagnose and initiate management of common ocular disorders.
- Exhibit leadership skills and professional characteristics and attitudes required in the role of ophthalmic health personnel or primary eye/health care manager.
- Demonstrate the necessary knowledge and skills to work in a variety of eye/health care settings.
- Promote the Ophthalmology system of medicine with modern knowledge and skills.

Group Size

The group size will be maximum of 40 (forty) students in a batch.

Entry Criteria

- SLC Pass or SLC/SEE with minimum GPA 2.0 and C grade in Compulsory Mathematics, English & Science.
- TSLC in Ophthalmology, with minimum 68.33%.
- Should pass the entrance examination as administered by CTEVT.

Duration

The total duration of this curricular program is three years. The program is based on yearly system. Moreover, one academic year consists of maximum of 35 academic weeks and one academic week consists of maximum 40 hours excluding evaluation period.

Medium of Instruction

The medium of instruction will be in English and/or Nepali.

Pattern of Attendance

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

Teacher and Student Ratio

The ratio between teachers and students must be:

- Overall ratio of teacher and student must be 1:10 (at the institution level).
- 1:40 for theory and tutorial classes
- 1:10 for practical classes
- 1:5 for hospital duty

- Minimum of 75% of the teachers must be fulltime.

Qualification of Teachers and Instructors

- The instructor must be a bachelor degree holder in related field.
- The demonstrator must have an intermediate level degree in related field with minimum of 2 years of experience in teaching activities.
- The foundational subject related teacher should be master degree holder in the related area.

Instructional Media and Materials

The following instructional media and materials are suggested for the effective instruction and demonstration.

- ***Printed Media Materials*** **(**assignment sheets, case studies, handouts, information sheets, individual training packets, procedure sheets, performance checklists, and textbooks).
- ***Non-projected Media Materials*** (display, models, flip chart, poster, writing board).
- ***Projected Media Materials*** (opaque projections, overhead transparencies, slides).
- ***Audio-Visual Materials*** (audiotapes, films, slide-tape programmes, videodiscs, videotapes).
- ***Computer-Based Instructional Materials*** (computer-based training, interactive video).

Teaching Learning Methodologies

The methods of teachings for this curricular programme will be a combination of different approaches (not limited to as mentioned here) such as illustrated lecture, tutorial, group discussion, demonstration, simulation, guided practice, practical experiences, fieldwork, report writing, term paper presentation, community campaign, case analysis, role-playing, heuristic, project work and other independent learning.

Theory: Lecture, discussion, seminar, interaction, assignment, group work.
Practical: Demonstration, observation, guided practice, self-practice, project work, clinical practice.

Mode of Education

There will be inductive and deductive mode of education.

Examination and Marking Scheme

a. Internal assessment

- There will be a transparent/fair evaluation system for each subject both in theory and practical exposure.

- Each subject will have internal assessment at regular intervals and students will get the feedback about it.
- Weightage of theory and practical marks are mentioned in course structure.
- Continuous assessment format will be developed and applied by the evaluators for evaluating student's performance in the subjects related to the practical experience.

b. Final examination

- Weightage of theory and practical marks are mentioned in structure.
- Students must pass in all subjects both in theory and practical for certification. If a student becomes unable to succeed in any subject s/he will appear in the re-examination administered by CTEVT.
- Students will be allowed to appear in the final examination only after completing the internal assessment requirements.

c. Requirement for final practical examination

- Professional of relevant subject instructor must evaluate final practical examinations.
- One evaluator in one setting can evaluate not more than 20 students.
- Practical examination should be administered in actual situation on relevant subject with the provision of at least one internal evaluator from the concerned or affiliating institute led by external evaluator nominated by CTEVT.
- Provision of re-examination will be as per CTEVT policy.

d. Final practicum evaluation will be based on:

- Institutional practicum attendance - 10%
- Logbook/Practicum book maintenance - 10%
- Spot performance (assigned task/practicum performance/identification/arrangement preparation/measurement) - 40%
- Viva voce :
  - Internal examiner - 20%
  - External examiner - 20%

Note: The evaluation and marking schemes for the subjects clinical and comprehensive field practice/study are mentioned separately in the respective sections of the curriculum.

e. Pass marks

- The students must secure minimum 40% marks in theory and 50% in practical. Moreover, the students must secure minimum pass marks in the internal assessment of each subject to appear final examination.

Provision of Back Paper

There will be the provision of back paper but a student must pass all the subjects of all year within six years from the enrollment date; however there should be provision of chance exam for final year students as per CTEVT rules.

Disciplinary and Ethical Requirements

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by the review of the disciplinary review committee of the institute.
- Dishonesty in academic or practical activities will result in immediate suspension followed by administrative review, with possible expulsion.
- Illicit drug use, bearing arms in institute, threats or assaults to peers, faculty or staff will result in immediate suspension, followed by administrative review with possible expulsion.

Grading System

The following grading system will be adopted:

- Distinction: 80% and above
- First division: 65% to below 80%
- Second division: 50 % to below 65%
- Pass division: Pass marks to Below 50%

Certification and Degree Awards

- Students who have passed all the components of all subjects of all 3 years are considered to have successfully completed the course.
- Students who have successfully completed the course will be awarded with a degree of **"Proficiency Certificate Level in Ophthalmic Science (Ophthalmology)".**

Career Opportunity

The graduates will be eligible for the position equivalent to Non-gazette 1st class/Level 5 (technical) as Health Worker of eye/ health institutions as prescribed by the Public Service Commission of Nepal and other related agencies. The graduate will be eligible for registration with Nepal Health Professional Council in the category mentioned in the Act of the Council.

General Attitudes Required

A student should demonstrate following general attitudes for effective and active learning.

Acceptance, Affectionate, Ambitious, Aspiring, Candid, Caring, Change, Cheerful, Considerate, Cooperative, Courageous, Decisive, Determined, Devoted, Embraces, Endurance, Enthusiastic, Expansive, Faith, Flexible, Gloomy, Motivated, Perseverance, Thoughtful, Forgiving, Freedom, Friendly, Focused, Frugal, Generous, Goodwill, Grateful, Hardworking, Honest, Humble, Interested, Involved, Not jealous, Kind, Mature, Open minded, Tolerant, Optimistic, Positive, Practical, Punctual, Realistic, Reliable, Distant, Responsibility, Responsive, Responsible, Self-confident, Self-directed, Self-disciplined, Self-esteem, Self-giving, Self-reliant, Selfless,

Sensitive, Serious, Sincere, Social independence, Sympathetic, Accepts others points of view, Thoughtful towards others, Trusting, Unpretentiousness, Unselfish, Willingness and Work-oriented.

Question Patterns for Final Written Exam

The question patterns for written exam are suggested as follows.

A. For subject with full marks 80

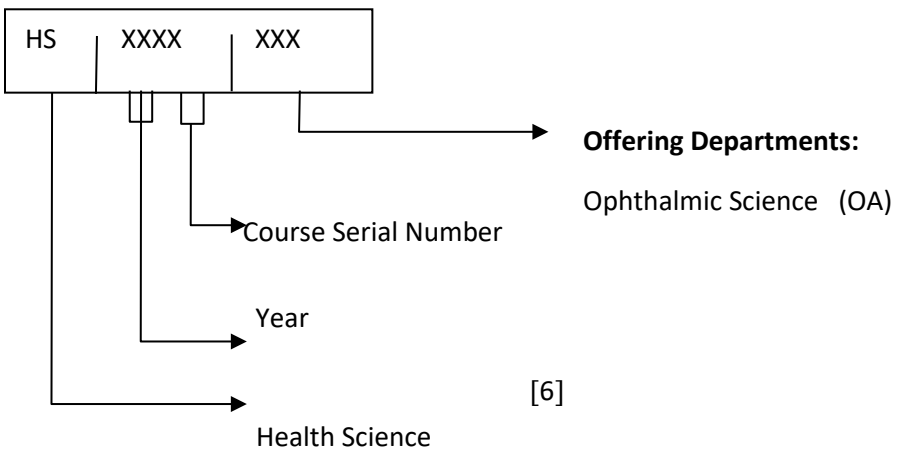
S.N.	Type of question	No of Question	Weightage marks	Full marks	Time distribution	Optional questions
1	Long	2	10	20	60 min.	1
2	Short	4	5	20	60min.	2
3	Very short	10	2	20	40 min.	2
4	Multiple	20	1	20	20 min.	
	Total	**36**		**80**	**180 min.**	

B. For subject with full marks 40

	Type of question	No of Question	Weightage marks	Full marks	Time distribution	Optional questions
1	Long	1	10	10	30 min.	1
2	Short	2	5	10	30 min.	1
3	Very short	5	2	10	20 min.	1
4	Multiple	10	1	10	10 min.	
	Total	**18**		**40**	**90 min.**	

Subjects Codes

Each subject is coded with a unique number preceded and followed by certain letters as mentioned in following chart



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Course Structure: Proficiency Certificate Level (Ophthalmic Science)

Second year

Teaching Schedule			Mode						DISTRIBUTION OF MARKS						Total Marks	Remark
									Theory			Practical				
SN	Course Code	Course Title	L	T	P	Lab	Weekly Hours	Credit Hours	*Assmt Marks	Final Marks	Time Hours	*Assmt Marks	Final Marks	Time Hours		
1	HS-0201-OA	Ocular Anatomy and Physiology	2		1		3	3	10	40	1.5	25	0	0	75	*Continuous assessment
2	HS-0202-OA	Ocular Pharmacology and Pathology	3		2		5	4	20	80	3	30	20	3	150	
3	HS-0203-OA	Ocular Disorder-I	4		4		8	6	20	80	3	60	40	4	200	
4	HS-0204-OA	Systemic Disease and Eye	2		0		2	2	10	40	1.5	0	0	0	50	
5	HS-0205-OA	Optics, Refraction and Binocular Vision	4		1		5	5	20	80	3	25	0	0	125	
6	HS-0206-OA	Investigative Ophthalmology	2		2		4	3	10	40	1.5	30	20	3	100	
7	HS-0207-OA	Ocular Surgery	4		3		7	6	20	80	3	60	40	4	200	
8	HS-0208-OA	Community Ophthalmology-I	3		3		6	5	20	80	3	60	40		200	
		Total	**24**		**16**		**40**	**34**	**130**	**520**		**290**	**160**		**1100**	

L= lecture T= Tutorial P= Practical

Third year: Proficiency Certificate Level (Ophthalmic Science)

Teaching Schedule			Mode						DISTRIBUTION OF MARKS						Total Marks	
									Theory			Practical				
SN	Course Code	Course Title	L	T	P	Lab	Weekly Hours	Credit Hours	*Asst Marks	Final Marks	Time Hrs.	*Asst Marks	Final Marks	Time Hrs.		
A.	7 weeks															
1.	HS-0301-OA	Ocular Disorder- II	10		0		10	2	10	40	1.5	0	0	0	50	
2.	HS-0302-OA	Community Ophthalmology-II	10		5		15	3	10	40	1.5	25	0		75	
3.	HS-0303-OA	Low Vision and Optical Dispensing	10		5		15	3	10	40	1.5	25	0		75	
B.	Total 28 weeks															
4.										Health Faculty supervisor			Internal	Final	Total	
5.	HS-0304-OA	Clinical Practice- I (OPD Based)*	11 weeks					6			87		87	176	350	
6.	HS-0305-OA	Clinical Practice- II (OT Based)*	8 weeks					5			75		75	150	300	
7.	HS-0306-OA	Clinical Practice- III (Community Based)*	9 weeks					5			75		75	150	300	
		Total	**(A +B) 35 weeks**					**24**	**30**	**120**					**1150**	

*continuous assessment

L= lecture T= Tutorial P= Practical

Master Plan

(Use as guidelines for implementation of theory and practical, detail plan of implementation should developed by respective institution itself)

Second Year

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
Study Block												O.A.P and O.P.P.			Study Block				O.D						
27	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**		**46**	**47**	**48**	**49**	**50**	**51**	**52**
Vacation								Study Block				I.O+ O.S and C.O			Revision / Internal Exam				Final exam						

O.A.P = Ocular Anatomy and Physiology O.P.P = Ocular Pharmacology & Pathology O.D = Ocular disorder-I

IO = Investigative ophthalmology O.S = Ocular Surgery C.O = Community ophthalmology-I

Third Year

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**
Study Block							Clinical Practice –I (OPD based)											Clinical Practice-II (OT based)							
27	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**

Vacation	Clinical Practice-III Community based	Revision / Internal Exam	Final exam

First Year

(Please see separate curriculum for General Health Science First Year all)

Second year

Subjects

1. Ocular Anatomy and Physiology
2. Ocular Pharmacology and Pathology
3. Ocular Disorder-I
4. Systemic Disease and Eye
5. Optics, refraction and Binocular Vision
6. Investigative Ophthalmology
7. Ocular Surgery
8. Community Ophthalmology-I

Ocular Anatomy and Physiology

Total Hours: 3 Hrs. /week
Theory Hours: 2 Hrs. /week
Practical Hours: 1 Hrs. /week

Course Description:

The course aims to equip the students with fundamental knowledge of the anatomy and physiology of the eye. After completion of the course, the students should be able to explain the structure and functions of a normal eye. They should be able to identify the different structures within the eye and explain their functions, distinguish between normal and abnormal ocular structures, and find out the diseases leading to those abnormalities.

Course Objectives

After completion of this course, students will be able to:

- Describe various anatomical structures of eye, its content and visual pathway.
- Describe dynamics of aqueous humour (formation, function and drainage system).
- Describe the physiology of Corneal transparency and hydration.
- Describe dynamics of tear production and drainage.
- Describe pupillary pathway for light reflex.

Course Contents:

Theory **70 Hrs.**

Unit 1: Anatomy of eyeball, its content and visual pathways **25 Hrs.**

1.1 Brief introduction to embryology of eye: three germinal layers and it's relation to eye
1.2 Anatomy of eyeball along with parts and layers of conjunctiva, cornea, sclera, scleral openings, choroid, lens, and retina
1.3 Anatomy of iris: parts and layers and pupil size controlling muscles
1.4 Anatomy of ciliary body: parts, layers, ciliary muscles
1.5 Anatomy of vitreous: parts of vitreous and attachments
1.6 Anatomy of the optic nerve: parts
1.7 Anatomy of optic chiasma and visual cortex: parts

Unit 2: Ocular adnexa **25 Hrs.**

2.1 Gross anatomy of orbit: walls, margin, bones forming the walls, contents.
2.2 Anatomy of Superior and Inferior orbital fissure: boundaries and contents.
2.3 Origin, insertion and nerve supply of extra ocular muscles:
  2.3.1 Orbicularis oculi, Levator palpebrae superioris, Superior rectus, Inferior rectus, Lateral rectus, Medial rectus, Superior oblique, Inferior oblique.
2.4 Origin, insertion and nerve supply of intra ocular muscles
  2.4.1 Ciliary muscle, Sphincter pupillae, Dilator pupillae
2.5 Functions of 2nd, 3rd, 4th, 5th 6th and 7th cranial nerve and its relation to eye.
2.6 Eyelids: layers, parts, margin, glands and nerve supply and function
2.7 Lacrimal system: main and accessory lacrimal glands, excretory apparatus: puncta, canaliculi, lacrimal sac, nasolacrimal duct
2.8 Ophthalmic artery, its branches and blood supply.

Unit 3: Ocular Physiology **20 Hrs.**

3.1 Dynamics of aqueous humor:
  3.1.1 Aqueous humor formation: site, mechanism of formation (secretion, diffusion, ultrafiltration)
  3.1.2 Functions of aqueous humor
  3.1.3 Angle structures: Schwalbe's line, trabecular meshwork, scleral spur, ciliary body band, root of iris
  3.1.4 Drainage of aqueous humor: trabecular mesh work path way, uveoscleral pathway
3.2 Corneal transparency and hydration
  3.2.1 Corneal transparency and its physiology
  3.2.2 Physiology of corneal hydration. (Active and passive mechanism)
3.3 Tear dynamics
  3.3.1 Mechanism of tear production
  3.3.2 Layers of tear film, their production and their function
  3.3.3 Mechanism of tear drainage
3.4 Pupillary pathway for light reflex
  3.4.1 Pupillary pathway: direct light reflex, consensual light reflex, and RAPD

Practical **35 Hrs.**

1. **Ocular anatomy practical** **20 Hrs.**

   Identify different parts of eye and describe anatomy of each part in brief.

   a. Lids
   b. Conjunctiva
   c. Cornea
   d. Sclera
   e. Aqueous humour
   f. Vitreous humour
   g. Iris and uveal tract
   h. Retina
   i. Optic nerve
   j. Extra ocular muscles

2. **Ocular physiology practical (Light reflex)** **15 Hrs.**

   Perform tests related to Pupillary Light Reflex Pathway:

   a. Direct light reflex
   b. Consensual light reflex
   c. RAPD (Relative Afferent Pupillary Defect)

Reference Textbooks

- Khurana, A. K. Anatomy and Physiology of the Eye. JP Enterprises.
- Sihota, R., & Radhika, T.*Parson's Diseases of the Eye* (22nd ed.). Elsevier.
- Bowling, Brad. *Clinical Ophthalmology* (8th ed.)

Final written exam marking scheme

Unit	**1**	**2**	**3**	**Total**
Unit Hours	25	25	20	70
Marks	14	14	12	40

Ocular Pharmacology and Pathology

Total Hours: 5 Hrs. /weeks
Theory Hours: 3 Hrs. /weeks
Practical Hours: 2 Hrs. /weeks

Course Description:

The course provides basic concepts on pharmacology and pathology with special reference to eye. The students will acquire knowledge on the selection of appropriate medications for specific diseases/conditions, their actions, indications, contraindications, and side effects. The course also offers basic introduction to ocular pathology that deals about medical microbiology and hematology with special reference to eye.

Course objectives

At the end of the course, the students will be able to:

- Describe pharmacodynamics and pharmacokinetics of drug.
- Familiar with the mechanism of action, indication, contraindication, adverse reactions of following drugs:
    a Antimicrobial drugs
    b NSAIDS and steroids
    c Antihistamines and anti-allergics
    d Anesthetics
    e Mydriatics and cycloplegics
    f Miotics and anti-glaucoma drugs
    g Lubricating agents
    h Nutritional supplements
- Write and describe prescription writing
- Describe concepts in bacteriology, virology, mycology, parasitology and hematology.
- Perform basic microbiological, biochemical and hematological tests in the laboratory setting.
- Describe sterilization and disinfection.

Course Content

Theory **105 Hrs.**

Unit 1: Introduction to Pharmacology **16 Hrs.**

1.1 Definition of pharmacology, pharmacodynamics and Pharmacokinetics

1.2 Pharmacokinetics: Describe drug absorption, bio-availability, distribution, penetration and drug elimination.

1.3 Definition of pharmacodynamics and its importance: Definition and brief introduction to receptor theory of drug.

1.4 Description of different routes of routes of administration of drugs (Local, Systemic and Ocular).

Unit 2: Anti-microbial agents: **20 Hrs.**

2.1 Antibacterial drugs: Uses, contraindication and side effects:

2.1.1 Beta lactams: penicillin, ampicillin, amoxicillin, cloxacillin.

2.1.2 Cephalosporins: Cefazolin, cefixime, cefadroxil.

2.1.3 Macrolides: Erythromycin, azithromycin.

2.1.4 Aminoglycosides: streptomycin, gentamicin, neomycin.

2.1.5 Tetracycline and doxycycline

2.1.6 Chloramphenicol

2.1.7 Fluoroquinolones

2.2 Antiviral drugs: Uses, contraindication and side effects of acyclovir.

2.3 Antifungal drugs: Uses, contraindication and side effects of natamycin, Miconazole, Ketoconazole, Fluconazole and Clotrimazole.

2.4 Antihelminthic drugs: Uses, contraindication and side effects of Albendazole and Mebendazole

2.5 Antiprotozoal drugs: Uses, contraindication and side effects of Metronidazole, Diloxanidefuroate.

Unit 3: NSAIDS and Steroidal Anti-inflammatory drugs **15 Hrs.**

3.1 Definition of pain, pyrexia and inflammation

3.2 Analgesic, antipyretic and anti-inflammatory drugs: Mechanism of action, indication contraindication, side effects, precautions and dose of Ibuprofen, Flurbiprofen, Indomethacin, Diclofenac, Nepafenac, Ketorolac, and Paracetamol.

3.3 Steroidal Drugs: Mechanism of action, indication contraindication, side effects, precautions and dose of Hydrocortisone, Prednisolone, Betamethasone and Dexamethasone

Unit 4: Anti-histamines and Anti-allergic **4 Hrs.**

4.1 Definition of of allergic reaction

4.2 Antihistamines and antiallergics: Mechanism of action, indication, contraindication, side effects, precautions and dose of Cetrizine, Fexofenadine, Chlorpheniramine, Sodium cromoglycate

Unit 5: Anesthetics: **10 Hrs.**

5.1 Definition of anesthetics.

5.2 Local anesthetics: Classification, Mechanism of action, indications, contraindications, side effects, precautions and dose of Xylocaine, Proparacaine, Lignocaine, Tetracaine and Procaine

5.3 General anesthetics: Classification, Mechanism of action, indications, contraindications, side effects, precautions and dose of Nitrous oxide, Halothane, Ketamine and Propofol

Unit 6: Mydriatics and Cycloplegics: **4 Hrs.**

6.1 Definition of mydriatics and cycloplegics

6.2 Mechanism of action, indications, contraindication, side effects, precautions and dose of Atropine, Homatropine, Scopolamine, Cyclopentolate, Tropicamide, Phenylephrine and Epinephrine

Unit 7: Miotics and antiglaucoma drugs: **10 Hrs.**

7.1 Definition of miotics

7.2 Miotics: Mechanism of action, indications, contraindications, side effects, precautions and dose of Pilocarpine, Physostigmine, Neostigmine, Ergotamine, Dibenamine.

7.3 Definition of glaucoma and anti-glaucoma drugs

7.4 Anti-glaucoma drugs: Classification, Mechanism of action, indications, contraindications, side effects and precautions

7.5 Dose of Timolol, Betaxolol, Levobunolol, Carbachol, Brimonidine, Apraclonidine, Acetazolamide, Dorzolamide, Latanoprost, Travoprost and Mannitol.

Unit 8: Lubricating Agents **2 Hrs.**

8.1 Definition of lubricating agent.

8.2 Lubricating Agents: Brief introduction and therapeutic uses

Unit 9: Nutritional Supplements **4 Hrs.**

9.1 Vitamins: Classification, Sources and Roles of commonly used water soluble and fat-soluble vitamins: vitamin A, vitamin B-complex, vitamin C, vitamin E, vitamin B_{12}.

Unit 10: Prescription writing **2 Hrs.**

10.1 Prescription: Definition, Parts of Prescription and abbreviations used in Prescription.

Unit 11: Ocular bacteriology **8 Hrs.**

11.1 Introduction to bacteria and its types.

11.2 Culture media and cultivation techniques of bacteria.

11.3 Explain the theory and procedure of Gram staining.

11.4 Describe methods for antibiotic susceptibility testing. (Tube dilution method.

a. And Paper diffusion method)

Unit 12: Ocular Virology **2 Hrs.**

12.1 Introduction to virus and its types.

12.2 Mode of infection, pathogenesis, laboratory diagnosis of Adenovirus and Herpes-Simplex virus.

Unit 13: Ocular mycology **2 Hrs.**

13.1 Introduction to fungi and its types.

13.2 Mode of infection, pathogenesis, laboratory diagnosis of *Candida spp*, *Fusarium spp*, Aspergillus *spp*.

Unit 14: Ocular Parasitology: 2 Hrs.

14.1 Define parasites and classify common ocular parasites.

14.2 Mode of infection, pathogenesis, laboratory diagnosis of Onchocerca volvulus, Loa loa and Acanthamoeba spp.

Unit 15: Hematology: 2 Hrs.

15.1 Blood, composition, function and blood cells.

15.2 Describe total leucocyte count (TLC), Differential leucocyte count (DLC), Haemoglobin and erythrocyte sedimentation rate (ESR) of blood.

Unit 16: Sterilization and Disinfection: 2 Hrs.

16.1 Define sterilization and disinfection.

16.2 Describe physical and chemical methods of sterilization and disinfection.

Practical 70 Hrs.

1. Prepare drug profile of commonly used ocular drugs.
2. Identify handling techniques of different laboratory goods.
3. Perform Gram stain and Giemsa stain.
4. Demonstrate use of autoclave, hot air oven etc.

Reference Books

- Paniker, C. K. (1993). *Textbook of Medical Parasitology*. New Delhi, India: Jaypee Brothers Medical Publishers.
- Tripathi, K. D. (2010). *Essentials of Medical Pharmacology*. New Delhi, India: Jaypee Brothers Medical Publishers.
- Pathak, T. B. (2011). *Medical Pharmacology and Pharmacy*. Kamalpokhari, Ktm: Bidhyarthi Prakashan.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8 &9**	**10&12**	**11**	**13,14,15 &16**	**Total**
Unit Hours	16	20	15	4	10	4	10	6	4	8	8	105
Marks	12	15	12	3	8	3	8	4	3	6	6	80

Ocular Disorders - I

Total Hours: 8 Hrs. /weeks
Theory Hours: 4 Hrs. /weeks
Practical Hours: 4 Hrs. /weeks

Course description

This course provides students the ability to diagnose, comprehend signs and symptoms, and manage eye disorders. It also gives skills and knowledge to perform a proper history taking and clinical examination, establish a diagnosis in diseases and provide available treatment. Referral system and competency for referral will be obtained by the end of the course. The course covers common ocular disorders, including congenital diseases, communicable conditions of the eye and also focuses on upgrading of knowledge on emerging and important non-communicable diseases such as diabetes, hypertension, and thyroid related diseases. It also aims to give preventive knowledge on diseases like retinopathy of prematurity.

Course objectives

At the end of the course, the students will be able to

- Describe various ocular disorders
- Perform required history taking, clinical examination with available resources and make diagnosis.
- Diagnose and manage ocular disorders and refer whenever necessary.
- Give available treatment.

Course content:

Theory **140 Hrs.**

Unit 1: Disease of lid and adnexa **25 Hrs.**

Congenital Anomalies and lid diseases

1.1 Congenital Anomalies: Enlist the congenital anomalies: Congenital Ptosis, Congenital coloboma, Epicanthus, Distichiasis, Cryptophthalmos

1.2 Classification of edema of eyelids: Inflammatory, Solid, Passive

1.3 Inflammatory disorders:

1.3.1 Different types of Blepharitis (Anterior and posterior): Clinical features and management

1.3.2 Chalazion: Clinical features and management

1.3.3 Internal hordeolum: Clinical features and management

1.3.4 Stye: Clinical features and management

1.3.5 Molluscum Contagiosum: Clinical features and management

1.4 Clinical features and treatment of anomalies in the position of lashes and lid margins

1.4.1 Trichiasis

1.4.2 Entropion

1.4.3 Ectropion

1.4.4 Symblepharon

1.4.5 Ankyloblepharon

1.4.6 Lagophthalmos

1.4.7 Blepharospasm

1.4.8 Blepharophimosis

1.4.9 Ptosis

1.5 Tumors:

1.5.1 Classification of eyelid tumors

1.5.2 Squamous cell carcinoma, basal cell

1.5.3 carcinoma, sebaceous gland carcinoma and malignant melanoma

1.5.4 Referral to higher center

1.6 Orbit

1.6.1 Pre -septal cellulitis: Definition, Causes, Signs and symptoms, Treatment

1.6.2 Orbital cellulitis: Definition, Causes, Signs and symptoms, Treatment

1.6.3 Introduction, clinical features and initial management of cavernous sinus thrombosis.

1.6.4 Referral of Orbital cellulitis and cavernous sinus thrombosis to higher center

1.6.5 Proptosis: Definition and classification, Causes, Signs and symptoms, Treatment

1.6.6 Referral for cases of Proptosis

1.6.7 Enlist the congenital anomalies of Orbit (Anophthalmos, Microphthalmos, Enophthalmos)

1.7 Lacrimal Drainage System

2.2.1 Dry eye: Causes, clinical evaluation and Management

2.2.2 Causes of watering eye

2.2.3 Clinical evaluation for the diagnosis of watering eye

2.2.4 Dacryocystitis: Definition, causes, clinical features and treatment modalities

2.2.5 Dacryoadenitis: Definition, causes, clinical features and treatment modalities

2.2.6 Canaliculitis: Definition, causes, clinical features and treatment modalities

Unit 2 Disease of Conjunctiva **20 Hrs.**

2.1 Inflammations of conjunctiva

2.1.1 Conjunctivitis: Definition, Types (Viral, Bacterial, Allergic, Protozoal)

2.1.1 Clinical features and management of different types of conjunctivitis including membranous and pseudomembranous conjunctivitis

2.1.2 Prevention of spread of acute viral conjunctivitis

2.1.3 Ophthalmia neonatorum: Definition, Clinical features and Management

2.2 Degenerative conditions

2.2.1 Pinguecula: Definition, clinical features and management

2.2.2 Pterygium: Definition, types, risk factors

2.2.3 Grading of pterygium.

2.2.4 Different treatment modalities of pterygium

2.2.5 Clinical manifestation and treatment of concretion

2.3 Clinical characteristics of different symptomatic conditions: hyperaemia, chemosis, ecchymosis, xerosis, discoloration

2.4 Cysts and Tumors of conjunctiva: List the different types of conjunctival cyst and tumors

Unit 3: Cornea and sclera **20 Hrs.**

3.1 Congenital anomalies: Enlist the congenital anomalies of cornea

3.1.1 Megalocornea

3.1.2 Microcornea

3.1.3 Cornea Plana

3.1.4 Congenital cloudy cornea

3.2 Inflammations of the cornea (Keratitis): Classification (Ulcerative and Non-ulcerative)

3.3 Ulcerative keratitis (Corneal ulcer): Definition, Types, Etiological agents (Bacterial, Viral, Fungal, Protozoal): risk factors, clinical features, complications and management

3.4 Trachoma: Definition, WHO Classification, Clinical features and Management

3.5 Episcleritis and scleritis: in brief

Unit 4: Lens and cataract **15 Hrs.**

4.1 Cataract: Definition and Classification

4.2 Congenital Cataract: Risk factors, clinical features and management

4.3 Acquired Cataract: Risk factors, clinical features and management

4.4 Grading of nuclear sclerosis

4.5 Complications of Cataract.

4.6 Cataract surgery: Indications, Brief description of different types of Cataract surgery, complications of Cataract surgery.

4.7 Different anomalies of lens position: causes and clinical features

4.8 Enlist the congenital anomalies of lens

- 4.8.1 Lens coloboma
- 4.8.2 Lenticonus
- 4.8.3 Lentiglobus
- 4.8.4 Microspherophakia

Unit 5: Uveal tract **13 Hrs.**

5.1 Enlist the Congenital anomalies

- 5.1.1 Polycoria
- 5.1.2 Aniridia
- 5.1.3 Persistent pupillary membrane
- 5.1.4 Coloboma
- 5.1.5 Corectopia
- 5.1.6 Heterochromia of iris

5.2 Uveitis: Definition, Classification in relation to anatomy

5.3 Clinical features of anterior, intermediate and posterior uveitis.

5.4 Management of uveitis with investigative tools, counseling components and the referral system.

5.5 Endophthalmitis: Definition, Etiopathogenesis, Classification, Management with the counseling of patients.

5.6 Differences between endophthalmitis and panophthalmitis.

5.7 Panophthalmitis: Definition, Causes, Clinical features, Management and Referral.

Unit 6: Glaucoma **13 Hrs.**

6.1 Glaucoma: Definition, Classification of glaucoma. (Congenital, Open angle glaucoma and Angle closure glaucoma)

6.2 Definition of ocular hypertension and its management.

6.3 Etiology, pathogenesis and clinical features of open angle glaucoma and angle closure glaucoma in brief.

6.4 Different investigations for the diagnosis of glaucoma.

6.5 Acute primary angle-closure glaucoma (Acute angle closure attack) : Diagnosis, Immediate management and referral.

Unit 7: Retina and Optic nerve **30 Hrs.**

7.1 Diseases of Retina

7.1.1 Different congenital anomalies of the retina (listening only)

7.1.2 Retinitis pigmentosa: Clinical features, Hereditary pattern, Counseling

7.1.3 Clinical features of retino-choroidal coloboma.

7.1.4 Retinal occlusive diseases: Central retinal artery occlusion, Central retinal venous occlusion and branch retinal vein occlusion (CRAO, CRVO and BRVO) in brief: Symptoms, Investigations, Treatment and Referral

7.1.5 Diabetic retinopathy:

i Classification

ii Clinical features of different grades of Diabetic retinopathy.

iii Different investigations used in the diagnosis and management.

iv Different modalities of treatment and referral

7.1.6 Hypertensive retinopathy: Definition, Classification, Symptoms/signs and Treatment

7.1.7 Retinopathy of prematurity (ROP): Definition, Risk factors, Treatment

7.2 Retinal Detachment and Other retinal diseases

7.2.1 Retinal detachment: Definition, Classification, Clinical features and referral

7.2.2 Macular hole: Definition, Symptoms and signs and referral

7.2.3 Central Serous Chorioretinopathy (CSCR): Definition, Clinical features and referral

7.2.4 Macular edema: Definition, Causes and referral

7.2.5 Age related macular degeneration (ARMD): Definition, Risk factors, Types, Clinical features, Investigations and Management

7.2.6 Retinoblastoma: Introduction, Clinical features and referral

7.3 Disc edema and Optic neuritis

7.3.1 Causes of disc edema.

7.3.2 Causes of papilledema.

7.3.3 Causes of Optic neuritis.

7.3.4 Different Investigations of disc edema and optic neuritis and referral

Unit 8: Strabismus and Amblyopia **4 Hrs.**

8.1 Strabismus: Brief description, Classification

8.2 Amblyopia: Definition, Classification, Causes, Treatment modalities (Patching and penalization therapy in brief)

Ocular Disorders - I: Practical **140 Hrs.**

Unit 1: Disease of lid and adnexa **27 Hrs.**

1.1 Perform history taking

1.2 Conduct clinical examination of eye lids and adnexa: position, movements, condition of skin, lid, margins, palpebral aperture.

1.3 Examine lacrimal apparatus:

1.3.1 Inspection

1.3.2 Regurgitation test

1.3.3 Syringing and probing

1.3.4 Case presentation

Unit 2: Diseases of Conjunctiva **17 Hrs.**

2.1 Perform history taking

2.2 Conduct clinical examination of conjunctiva: Torchlight and slit-lamp examination

2.3 Identify Conjunctival signs: Discoloration, chemosis, congestion, follicles, papillae, concretions, foreign bodies, scarring, pinguecula, pterygium, cyst, tumor.

2.4 Perform Conjunctival swab collection

2.5 Present Case

Unit 3: Cornea and sclera **18 Hrs.**

3.1 Perform history taking

3.2 Conduct examination of Cornea: Size, shape, surface, transparency, sheen, vascularization, and sensation.

3.3 Conduct corneal stains: Fluorescein, Bengal rose

3.4 Assist in corneal scraping

3.5 Conduct examination of sclera: discoloration, inflammation

3.6 Perform case presentation

Unit 4: Lens and Cataract **20 Hrs.**

4.1 Perform history taking

4.2 Conduct examination of lens: position, shape, color, transparency

4.3 Conduct grading of nuclear sclerosis

4.4 Perform case presentation

Unit 5: Uveal tract **15 Hrs.**

5.1 Perform history taking

5.2 Conduct examination of anterior chamber: depth, content, angle

5.3 Conduct examination of iris: color, pattern, PPM, synechiae, nodules, cyst, new vessels

5.4 Conduct examination of pupil: number, location, size, shape, color, pupillary reactions

5.5 Perform case presentation

Unit 6: Glaucoma **13 Hrs.**

6.1 Perform history taking

6.2 Conduct examination of anterior chamber depth

6.3 Perform IOP measurement

6.4 Conduct case presentation

Unit 7: Retina and Optic nerve **15 Hrs.**

7.1 Perform history taking

7.2 Conduct fundus examination: Optic disc, macula, retinal vessels

7.3 Conduct case presentation

Unit 8: Strabismus and Amblyopia **15 Hrs.**

8.1 Perform history taking

8.2 Conduct examination of strabismus: Hirschberg test, cover-uncover test, cardinal positions of gaze

8.3 Conduct occlusion procedures

8.4 Conduct case presentation

Reference books

- 'Khurana, A. K. *Comprehensive Ophthalmology*. New Age International (P) Limited, Publishers.
- Sihota, R., & Tandon, R. *Parson's Diseases of the Eye.* Elsevier.
- Bowling, B. *Clinical Ophthalmology.*

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**
Unit Hours	25	20	20	15	13	13	30	4	140
Marks	14	12	12	8	8	8	16	2	80

Systemic Diseases and Eye

Total Hours: 2 Hrs. /week
Theory Hours: 2 Hrs. /week
Practical Hours: 0 Hrs. /week

Course Description

This course will provide the students with concepts and ideas of diseases in general medicine related to the eye. The eye being involved with the various organ systems and their diseases has to be dealt in a proper understanding of the pathogenesis and the diseases presentation in relation to the eye. Diseases like Diabetes Mellitus, Hypertension and Thyroid disorders are emerging as major non-communicable disorders hence understanding these diseases and their impact on the eye are of utmost importance to the health professional's knowledge and skills.

Course Objectives

After completion of this course, students will be able to:

- Explain the systemic diseases related to eye.
- Explain about diabetes mellitus and its clinical impact on eye.
- Explain about hypertension and its impact on eye.
- Explain the thyroid disease and its impact on eye.
- Explain about the different connective tissue diseases and its impact on eye.
- Take systemic history and identify clinical systemic manifestations.
- Diagnose ocular manifestations of systemic diseases and provide available treatment, counseling and the needful referral to the higher center.
- Describe and diagnose nutritional deficiencies and their ocular manifestation.

Course Content:

Theory **70 Hrs.**

Unit 1: Diabetes Mellitus: **15 Hrs.**

1.1 Definition, prevalence, risk factors, clinical features, complications and management of Diabetes

1.2 Diabetic Retinopathy: Prevalence, pathogenesis, risk factors and clinical features

1.3 Classification of diabetic retinopathy

1.4 Management of diabetic retinopathy

Unit 2: Hypertension: **12 Hrs.**

2.1 Brief introduction of Hypertension: Definition, prevalence, risk factors, clinical features, complications and management of Hypertension

2.2 Hypertensive Retinopathy: Pathogenesis, risk factors and clinical features

2.3 Classification of hypertensive retinopathy

2.4 Management of hypertensive retinopathy

Unit 3: Thyroid eye disease **10 Hrs.**

3.1 Introduction: Thyroid gland and its functions, hyperthyroidism and hypothyroidism

3.2 Clinical features of Thyroid eye diseases (Thyrotoxicosis/Hyperthyroidism)

3.3 Investigations of Thyroid eye diseases.

3.4 Complications and management of Thyroid eye diseases.

Unit 4: Nutritional deficiencies **12 Hrs.**

4.1 Vitamin A deficiency

4.1.1 Introduction, prevalence, pathogenesis in general and in relation to eye in Vitamin A deficiency

4.1.2 Clinical features - symptoms and signs of Vitamin A deficiency

4.1.3 WHO classification of Vitamin A deficiency

4.1.4 Management of vitamin A deficiency

4.2 Malnutrition: in brief

4.2.1 Pathogenesis and risk factors of Malnutrition

4.2.2 Clinical features of Malnutrition

4.2.3 Management of multiple vitamin deficiency and malnutrition and needful referral.

Unit 5: Other Systemic Diseases **21 Hrs.**

5.1 Introduction, clinical features (signs and symptoms), ocular manifestations, investigations and management of the following listed disease:

5.1.1 Tuberculosis

5.1.2 Leprosy

5.1.3 Syphilis

5.1.4 Gonorrhea

5.1.5 Rubella

5.1.6 Toxoplasmosis

5.1.7 HIV/AIDS

Reference books:

1. 'Khurana, A. K *Comprehensive Ophthalmology*. New Age International (P) Limited, Publishers.
2. Sihota, R., & Tandon, R *Parson's Diseases of the Eye*. Elsevier.
3. Bowling, B. *Clinical Ophthalmology*.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**Total**
Unit Hours	15	12	10	12	21	70
Marks	8	7	6	7	12	40

Optics, Refraction and Binocular Vision

Total Hours: 5 Hrs. /week
Theory Hours: 4 Hrs. /week
Practical Hours: 1 Hrs. /week

Course Description

The course aims to provide the fundamental knowledge of the optics, refraction and binocular vision. The course will focus on understanding of the light, its clinical implications, and the different optical conditions of the eye. Once they are competent on the optics of the eye they will be trained on the techniques to measure refractive error and refine it. The course also provides knowledge on eye teaming and focusing to perceive the world in synchronized manner, how the eyes will behave once this harmony is disturbed. This knowledge will enable them to assist in the clinical management of the cases with binocular disorders.

Course Objectives

At the end of the course, the students will be able to:

- Understand the light and its properties
- Explain the behavior of light in different media.
- Familiarize with different models of schematic eye and their component.
- Conceptualize different refractive condition of the eye, assess and manage them.
- Understand and assess strabismic and non-strabismic binocular disorders accommodation and asses them.

Course Content

Theory **140 Hrs.**

Unit 1: Optics Theory: **25 Hrs.**

1.1 Light, its nature and interaction with reflective & refractive medium **10 Hrs.**

1.1.1 Introduction to light

1.1.2 Wave and particle theory of light

1.1.3 Interference, Diffraction and Scattering

1.1.4 Sign conventions for ray diagram and image formation

1.1.5 Reflection and refraction through Plane and curved surface

1.1.6 Reflection and refraction in eye

1.2 Cardinal points Theory: **8 Hrs.**

1.2.1 Introduction and importance in lens system

1.2.2 Introduction to thin and thick lens.

1.2.3 Introduction to Gullstrand eye model, simple eye and reduced eye with the defined parameters

1.2.4 Meniscus lens and its advantages

1.2.5 Lenticular lens and myodisc

1.3 Manufacturing of ophthalmic lenses Theory: **7 Hrs.**

1.3.1 Manufacturing of plastic and glass lenses.

1.3.2 Properties of ophthalmic lens

1.3.3 Chromatic and Monochromatic aberration in lens

Unit 2: Refraction **50 Hrs.**

2.1 Visual Acuity and Refractive Errors **18 Hrs**.

2.1.1 Definition and concept of visual acuity

2.1.2 Introduction to distance (Snellen's and LogMAR) and near vision chart

2.1.3 Notations for visual acuity recording

2.1.4 Methods of VA recording in different age group, Pinhole, principle and uses

2.1.5 Definition and concept of refractive error and its basic management (Myopia, Hyperopia and Astigmatism)

2.1.6 Introduction to special type of refractive error (Anisometropia, Antimetropia and Aniseikonia)

2.1.7 Introduction to presbyopia, classification and its basic management

2.2 Objective and subjective refraction **20 Hrs.**

2.1.1 Parts of retinoscope, optical principle, reflex characteristics and procedure.

2.1.2 Types of retinoscopy

2.1.3 Introduction to objective refraction and its importance

2.1.4 Keratometry, principle and procedure

2.1.5 Autorefractometer, introduction and procedure

2.1.6 Introduction to subjective refraction and its importance

2.1.7 Procedures for Spherical power determination and refinement (Fogging, Duochrome)

2.1.8 Procedures for cylindrical power and axis determination and refinement (Stenopic slit and JCC)

2.3 Specifying lens power, Prescription writing and Power verification **6 Hrs.**

2.3.1 Introduction to Spherical lens, cylindrical, sphero-cylinder lens and power

2.3.2 Prescription writing and transposition

2.3.3 Basic concept on handheld neutralization and lensometry

2.4 Contact lens, contact lens solution and complication of contact lens **6 Hrs.**

2.4.1 Introduction to contact lens types, indication and contraindication

2.4.2 Introduction to contact lens solution and it components

2.4.3 Common complications in Soft and Hard contact lens wear

2.4.4 Referral criteria for contact lens fitting

Unit 3 Binocular Vision: 65 Hrs.

3.1 Introduction to Binocular single vision, prerequisites, Grades of BSV, Extraocular muscles (EOM) **8 Hrs.**

3.1.1 Various laws for muscle action

3.1.2 Primary, Secondary and Tertiary action of EOM

3.1.3 Law of EOMs

3.2 Accommodation and convergence Theory: **14 Hrs.**

3.2.1 Accommodation and its effect in ocular alignment

3.2.2 Anomalies of accommodation

3.2.3 Convergence and its effect in ocular alignment

3.2.4 Convergence-divergence anomalies

3.2.5 Basic tools and procedure for measuring convergence and accommodation problems

3.3 Ocular misalignment of eyes **14 Hrs.**

3.3.1 Heterophoria: Esophoria, exophoria, vertical phoria and their measurement

3.3.2 Heterotropia: Exotropia, Esotropia, vertical tropia and their measurement

3.3.3 Comitant vs incomitant squint

3.4 Motor and sensory adaptation to strabismus **6 Hrs.**

3.4.1 Introduction to Diplopia, Abnormal Retinal correspondence and Suppression

3.4.2 Introduction to diplopia and Hess charting

3.5 Basic tests in Orthoptics setting **12 Hrs.**

3.5.1 Hirschberg and Krimsky test

3.5.2 Cover test, Prism cover test and its types

3.5.3 Accommodative and vergence test

3.5.4 Tests for suppression and stereopsis

3.6 Amblyopia, Nystagmus, Computer Vision Syndrome (CVS) and its management 11 Hrs.

3.6.1 Introduction, Cause, types and basic management of Amblyopia, Nystagmus and CVS

Practical **35 Hrs.**

1	Assess visual acuity for near and distance in pediatric age group and adult.	**3 Hrs.**
2	Perform Retinoscopy**.**	**4 Hrs.**
3	Perform objective refraction.	**5 Hrs.**
4	Perform subjective refraction.	**4 Hrs.**
5	Perform Keratometry and Autoreafractometry.	**3 Hrs**.
6	Perform soft contact lens fitting and assist in hard contact lens fitting.	**2 Hrs.**
7	Perform EOM testing.	**2 Hrs.**
8	Perform/assist in accommodation and vergence testing (convergence & divergence) testing.	**2 Hrs.**
9	Assist in Non Strabismic and Strabismic patient evaluation.	**3 Hrs.**
10	Assist in Diplopia and Hess charting.	**2 Hrs**.
11	Assist in Amblyopia evaluation.	**3 Hrs.**

12. Assist in Nystagmus evaluation. **2 Hrs.**

Recommended Books

- Elder, D. *Practice of Refraction (10th ed.).*
- Khurana, A. K. *Theory of Practice of Optics and Refraction* (*5th ed.).*
- Sharma, P. *Strabismus Simplified (2nd ed.).*
- Khurana, A. K. *Theory Practice Squint and Orthoptics* (*3rd ed.).*
- Fanin, T. E., & Grosvenor, T. P. *Clinical Optics.*
- Borish, I. M. *Borish Clinical Refraction* (2nd ed.).
- Rabbetts, R. B. *Clinical Visual Optics (4th ed.).*
- Von Noorden, G. K. *Binocular Vision and Ocular Motility (6th ed.).*

Unit	**1**	**2**	**3**	**Total**
Unit Hours	25	50	65	140
Marks	14	28	38	80

Investigative Ophthalmology

Total Hours: 4 Hrs. /week
Theory Hours: 2 Hrs. /week
Practical Hours: 2 Hrs. /week

Course Description

This course provides the student with the knowledge and skills required to carry out the important investigations in ophthalmic practice. Students will acquire knowledge on the need for different investigation procedures for specific eye problems, and interpret the findings of the investigations.

Course Objectives

After completion of this course, students will be able to:

- Measure visual acuity (near and distance)
- Perform colour vision test
- Perform Schirmer test and syringing test
- Measure Intra Ocular Pressure (IOP)
- Perform Visual field and ultrasonography
- Conceptualize Fundus Fluorescence Angiography (FFA) and gonioscopy
- Perform Exophthalmometry, pachymetry, keratometry and fundus and anterior segment photography
- Perform Fundus examination with direct and indirect ophthalmoscopy
- Perform slit-lamp bio-microscopy.

Course Contents:

Theory **70 Hrs.**

Unit 1: Visual Acuity **6 Hrs.**

1.1 Definition and principle of visual acuity.

1.2 Methods of Specifying visual acuity for distance (LogMAR, Snellen's fraction, MAR, Percentage, Decimal, VAR) and near. Conversion test distance.

1.3 Different types of vision charts with its proper distance for adult and their procedures (Snellen's chart, Landolt 'C' chart, Tumbling 'E' chart, ETDRS LogMAR chart)

1.4 Different types of vision acuity charts for children < 3 Yrs age (OKN Test, Catford drum Test, HOTV chart, Preferential looking Test, Sheridan Gardiner Test, Picture Chart, Lea Symbols)

Unit 2: Contrast and Colour Vision **6 Hrs.**

15.1 Different indication of colour vision and contrast sensitivity testing

15.2 Types of colour vision anomalies and associated diseases

15.3 Different tools for colour vision assessment (Procedure and interpretation of Ishihara colour vision chart).

15.4 Different tools for contrast sensitivity measurement (Procedure and interpretation of Pelli-Robson Chart)

Unit 3: Tonometry **4 Hrs.**

3.1 Definition of Intraocular Pressure (IOP), factors affecting IOP and Various Methods of measuring intraocular pressure (Digital, Schiotz, Goldmann Applanation Tonometry, Non-Contact Tonometry)

Unit 4: Anterior Chamber evaluation **4 Hrs**

4.1 Procedure and interpretation of Van-Herrick and Iris Shadow Test

4.2 Introduction to Gonioscopy

Unit 5: Visual Field **8 Hrs.**

5.1 Definition and indications of visual field assessment

5.2 Different techniques of visual field assessment (Confrontation, Amsler grid, Humphrey visual field test, Goldman Perimetry)

5.3 Procedure and interpretation of confrontation test, Amsler grid, Humphrey visual field test

Unit 6: Ultrasonography **4 Hrs.**

6.1 Definition, Types, procedure and interpretation of Ultrasonography

Unit 7: Dry Eye **4 Hrs.**

7.1 Different methods for the assessment of Dry Eye (Schirmer's test type I, type II, TBUT, Tear meniscus level, Rose Bengal Staining)

7.2 Procedure and interpretation of Schirmer's test

Unit 8: Syringing and Probing **4 Hrs.**

8.1 Definition of Syringing and Probing

8.2 Principle, Types, and Procedure

8.3 Interpretation and Complications

Unit 9: Blood Pressure and Blood Sugar **4 Hrs.**

9.1 Define Blood Pressure

9.2 Instruments for measuring blood pressure (Sphygnomanometery).

9.3 Normal and abnormal blood pressure at different age groups

9.4 Interpretation of blood sugar level (FBS, PPBS, RBS and HbA1C).

Unit 10: Exophthalmometry **2 Hrs.**

10.1 Exophthalmometry. Normal and abnormal Exophthalmometry findings

10.2 Types of equipment used for measuring exophthalmos (Hertel Define)

Unit 11: OCT and Fundus Photography **2 Hrs.**

11.1 Definition and indications

Unit 12: Pachymetry **2 Hrs.**

12.1 Definition, indications and interpretation

Unit 13: Biometry **6 Hrs.**

13.1 Definition and procedures1

13.2 Different formulae for IOL power calculation

Unit 14: Ophthalmoscopy and Slit lamp Biomicroscopy **8 Hrs.**

14.1 Definition and Principle of direct and indirect Ophthalmoscopy

14.2 Procedure of Direct Ophthalmoscopy

14.3 Different types of lenses available for fundus evaluation and methods of Lens Care.

14.4 Procedure of slit lamp evaluation and methods of Illumination

Unit 15: Fundus Fluorescein Angiography (FFA) **6 Hrs.**

15.1 Introduction and procedure

15.2 Indications, contraindication and complications

Practical **70 Hrs.**

1. Assess visual acuity for near and distance in adults and pediatric age groups **6 Hrs.**
2. Perform color and contrast sensitivity assessment **6 Hrs.**
3. Perform clinical Refraction (Objective and Subjective) **6 Hrs.**
4. Assess visual field (Confrontation, Goldman and Humphrey) **12 Hrs.**
5. Perform Slit lamp Biomicroscopy, Van Herrick **4 Hrs.**
6. Perform Schiotz Tonometry **4 Hrs.**
7. Perform Ophthalmoscopy **6 Hrs.**
8. Perform USG and biometry **6 Hrs.**
9. Perform Fundus Photography **6 Hrs.**
10. Assist in FFA **6 Hrs.**
11. Measure Blood pressure by using Sphygmomanometer **4 Hrs.**
12. Assist in OCT **4 Hrs.**

Recommended texts

- Khurana, A. K. *Comprehensive ophthalmology*. New Delhi, India: New Age International Publishers.
- Grosvenor, T. *Primary care optometry*. Butterworth-Heinemann.
- Stein, H. A. *The ophthalmic assistant*.
- Karmacharya, P. C. *Textbook of ophthalmology for paramedicals*.
- Chopdar, A. *Fundus fluorescein and indocyanine green angiography*.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10,11 &12**	**13**	**14**	**15**	**Total**
Unit Hours	6	6	4	4	8	4	4	4	4	6	6	8	6	70
Marks	4	4	2	2	4	2	2	2	2	4	4	4	4	40

Ocular Surgery

Total Hours: 7 Hrs. /week
Theory Hours: 4 Hrs. /week
Practical Hours: 3 Hrs. /week

Course Description

This course provides knowledge and skills to the students about different types of ocular surgical techniques, investigative, procedures and basic ophthalmic nursing procedure required to perform during, after and or before surgery. Student will also develop knowledge and skills on the ocular surgical procedures to assist the ophthalmologist and on the eligible cases to perform specified minor surgeries on their own.

Course Objectives

At the end of the course, the students will be able to:

- Describe the different role of ophthalmic assistant in the hospital and community.
- State the specific ophthalmic nursing care of the individual receiving ocular surgery.
- Explain the concept of operation theatre and prepare patient for ocular surgery.
- Prepare surgical instrument set for different ophthalmic surgery and sterilize ophthalmic OT, basic instruments and equipment and consumables required for surgeries.
- Carryout aseptic procedure and infection control during ocular surgery and assist the ophthalmologist in different types of ocular surgeries
- Perform different types of ocular minor surgical procedures and investigations independently.
- State the pre -operative and post -operative care of different types of ophthalmic surgery.
- Identify the different type of anesthesia for ocular surgery.
- Explain the role of ophthalmic assistant in administration of drug.

COURSE CONTENT

Theory 140 Hrs.

Unit 1. Introduction to Ophthalmic Assistant 2 Hrs.

1.1 Ophthalmic assistant: Definition, Traits, Roles and responsibilities

Unit 2. Ophthalmic Nursing Care 10 Hrs.

2.1 Ophthalmic Nursing measures to assess the patient.

2.1.1 Vital signs -Definition and purpose

2.2 Temperature

2.2.1 Regulation

2.2.2 Factors affecting body temperature.

2.2.3 Alteration

2.2.4 Techniques of measurements and recording.

2.2.5 Types of fever.

i. constant

ii. Intermittent

iii. Relapsing.

2.2.6 Grading of fever.

i. Hyper pyrexia.

ii. Pyrexia.

iii. Sub normal

iv. Hypothermia.

2.3 Principles and methods of measuring temperature; oral, axilla, groin pulse

2.3.1 Definition, Types, characteristics, Factors affecting pulse, Sites of checking the pulse.

2.4 Respiration

2.4.1 Definition, Types, Characteristics of normal respiration., Factors affecting respiration.

2.5 Blood Pressure.

2.5.1 Definition, types, Systolic and diastolic, Purpose, Factors affecting, Sites of measuring

Unit 3: Operation Theatre **40 Hrs.**

3.1 Operation Theatre management.

3.1.1 Objective

3.1.2 Principal

3.1.3 Operation theatre personnel.

3.1.4 Characteristics of ophthalmic assistant.

3.1.5 Operation theatre attire.

3.1.6 Cleaning of operation theatre.

3.1.7 Instruments processing in operation theatre.

3.1.8 Hand washing, surgical scrubbing, gowning, gloving

3.1.9 Role and responsibilities of scrub personnel.

3.1.10 Role and responsibilities of circulating personnel.

3.1.11 Trolley preparation for different surgery.

3.1.12 List out the basic ophthalmic instruments used in ocular surgery.

3.1.13 Introduction to Operation theatre equipment.

3.1.14 Knowledge about the consumables and non-consumables.

3.1.15 OT hazards and risk management.

3.2 Anesthesia

3.1.1 Definition

3.1.2 Types

3.1.3 Anesthesia in ocular surgery

3.1.4 Complication

3.1.5 Equipment used in anesthesia

3.1.6 Role and responsibilities of anesthetics ophthalmic assistant

3.1.7 Management of recovery patient

3.3 Pre-operative care

3.1.1 Definition

3.1.2 Purposes

3.1.3 Articles require for pre-operative care

3.1.4 Component

3.1.5 Counseling

3.1.6 Pre -operative care for different surgery

3.4 Post- operative care

3.4.1 Definition

3.4.2 Purpose

3.4.3 Articles require

3.4.4 Care of patient in recovery room

3.4.5 Post- operative care for different surgery

3.4.6 Post- operative dressing, instruction, discharge- and follow up

3.5 Drug Administration (Review from pharmacology)

3.5.1 Route of administration of drugs

3.5.2 Oral medication

3.5.3 Route of ocular medicines.

3.5.4 Preparing medication from ampoule

3.5.5 Preparing medication from vials.

3.5.6 Intramuscular injection

3.5.7 Intravenous medication

i. Venipuncture

ii. Starting new I/V line

iii. Intravenous care

iv. Complication of I/V infusion

3.6 Instilling medication into eye/nose

3.7 Topical medication.

3.8 Rules for administration of medicine.

Unit 4: Ocular surgery (Assisting) 60 Hrs.

4.1 Cataract**.**

4.7.1 Review different types of cataract surgery.

4.7.2 List the instrument of SICS+IOL

4.7.3 List the instrument of phaco emulsification + IOL

4.7.4 Step of surgery (phaco, SICS, ECCE

4.7.5 Trolley preparation for different cataract surgery

4.2 Consumable and medicines used in cataract surgery.

4.3 Glaucoma

4.3.1 Review different types of glaucoma surgery.

4.3.2 List the instruments of different types of glaucoma surgery.

4.3.3 Trolley preparation for different glaucoma surgery

4.3.4 Consumable and medicines used in glaucoma surgery.

4.4 Surgery of the Nasolacrimal passage

4.4.1 Review the types of DCR surgery.

4.4.2 List the instruments of different type of surgery.

4.4.3 Trolley preparation for different DCR surgery

4.4.4 Consumable and medicines used in lacrimal sac surgery.

4.5 Strabismus

4.5.1 Review the types of strabismus surgery.

4.5.2 List the instruments used in surgery.

4.5.3 Step of the surgery.(one muscles/two/three muscles)

4.5.4 Trolley preparation for different strabismus surgery

4.5.5 Consumable and medicines used in surgery.

4.6 Keratoplasty

4.6.1 Review of keratoplasty surgery

4.6.2 List the instruments of different type of keratoplasty (PK/TPK/PK IOL/DSEK/DEMEK

4.6.3 Trolley preparation for different Keratoplasty surgery

4.6.4 Consumable and medicines used in surgery.

4.7 Vitrectomy

4.7.1 Retinal detachment

i. Review of different types RD surgery.

ii. List the instruments used in RD surgery (Pneumatic retinopexy, Cryobuckle, Bandbuckle

iii. Trolley preparation for different RD surgery

iv. Consumable and medicines used in surgery.

4.7.2 Lid surgery.

i. Review of different type of lid surgery.

ii. List the instruments used in different types of lid surgery. (Entropion, Ectropion, Ptosis and reconstruction)

iii. Step of surgery.

iv. Consumable and medicines used in surgery.

4.7.3 Orbitotomy

i. Review of different type of orbitotomy surgery.

ii. List the instruments used in surgery. (Anterior orbitotomy, Middle orbitotomy, Posterior orbitotomy with bone work.

iii. Trolley preparation for different orbitotomy surgery

iv. Consumable and medicines used in surgery.

4.8 Enucleation

4.8.1 Review of Enucleation surgery.

4.8.2 List the instruments used in surgery.

4.8.3 Trolley preparation for Enucleation surgery

4.8.4 Consumable and medicines used in surgery.

4.9 Evisceration

4.5.1 Review of evisceration surgery.

4.5.2 List the instruments used in surgery.

4.5.3 Trolley preparation for Evisceration surgery

4.5.4 Consumable and medicines used in surgery.

4.10 Exenteration

4.10.1 Review of exenteration.

4.10.2 List the instruments used in surgery.

4.10.3 Trolley preparation for Exenteration surgery

4.10.4 Consumable and medicines used in surgery.

4.11 Excision biopsy

4.11.1 List the instruments used in surgery.

4.11.2 Step of surgery(Small, Medium, Big

4.11.3 Trolley preparation for Enucleation surgery

4.11.4 Consumable and medicines used in surgery.

4.12 Electro-epilation

4.12.1 Review the anatomy of lid and disorder.

4.12.2 List the instruments use in electro- epilation.

4.12.3 Trolley preparation for Electro-epilation surgery

4.12.4 Consumable and medicines used in electro epilation.

4.13 Pterygium excision and conjunctival graft.

4.13.1 Review of anatomy and disorder of conjunctiva.

4.13.2 List the instruments use in pterygium excision and conjunctival graft.

4.13.3 Step of surgery.

4.13.4 Trolley preparation for Enucleation surgery

4.13.5 Consumable and medicines used in surgery.

Unit 5: Minor extra ocular surgery. (Chalazion I and C) 28 Hrs.

5.1 Review anatomy and physiology of the eye lid.

4.5.1 Disorder of the lid.

i Chalazion.

ii Entropion.

iii Lid Abscess.

iv Lid laceration (Trauma).

5.2 Chalazion incision and curettage

5.2.1 Introduction

5.2.2 Instruments.

5.2.3 Consumable.

5.2.4 Patient Preparation/ Trolly preparation

5.2.5 Step and procedures of surgery.

5.2.6 Complication of surgery.

5.2.7 Post- operative care.

5.3 Entropion Correction

5.3.1 Introduction.

5.3.2 Instruments.

5.3.3 Consumables.

5.3.4 Patient Preparation/Trolly preparation.

5.3.5 Step and procedures of surgery.

5.3.6 Complication of surgery.

5.3.7 Post- operative care.

5.4 Lid abscess Incision and Drainage.

3.3.1 Introduction.

3.3.2 Instruments.

3.3.3 Consumable.

3.3.4 Patient preparation/Trolley preparation.

3.3.5 Step and procedure of surgery.

3.3.6 Complication of surgery.

3.3.7 Post- operative care.

5.5 Lid laceration repair.

5.5.1 Introduction

5.5.2 Instruments.

5.5.3 Consumables.

5.5.4 Patient preparation/Trolley preparation.

5.5.5 Post- operative care.

Practical **105 Hrs.**

1	Measure vital signs.	**10 Hrs**.
2	Set up Operation Theatre	**4 Hrs.**
3	Records data of patient in Operation Theatre.	**6 Hrs.**
4	Perform Disinfection and sterilization in Operation Theater.	**5 Hrs.**
5	Perform instrument cleaning, packing and sterilization.	**5 Hrs**.
6	Perform scrubbing, gowning and gloving methods.	**10 Hrs.**
7	Perform ocular Anesthetics	**10 Hrs.**
8	Identify complications secondary to anesthetics	**5 Hrs.**
9	Prepare trolly and instrument required in cataract surgery.	**10 Hrs.**
10	Assist Cataract Surgery.	**10 Hrs.**

11 Assisting in specialty surgery. **10 Hrs**.
12 Performing pre and post-operative care. **10 Hrs.**
13 Perform minor surgery (Chalazion I&C). **10 Hrs**.

Final written exam marking scheme

Unit	**1 & 2**	**3**	**4**	**5**	**Total**
Unit Hours	12	40	60	28	140
Marks	7	23	34	16	80

Community Ophthalmology -I

Total Hours: 6 Hrs. /week
Theory Hours: 3 Hrs. /week
Practical Hours: 3 Hrs. /week

Course Description

Part I (Community Health)

This course provides the knowledge and skill to the students to plan, implement, monitor and evaluate the eye health care need and interventions in defined population. Developing tools to assess the magnitude of eye problem calculate disease burden and make conversant with current national and global eye health strategies and plan on eye health. Make conversant with importance of community participation in eye health including concept of primary health/eye health care.

Part II (Research Strategy and community diagnosis)

This course also comprises on comprehensive idea and be able to explain research and epidemiological aspects, concept importance, type of research carried out in eye health, interpret the research findings and perform community diagnosis as practical of health need assessment

Course Objectives

At the end of the course, the students will be able to:

- Assess quality of eye health at community, state and national level.
- Manage community participation for planning and implementing eye care programs.
- Conduct and evaluate eye health intervention programs.
- Organize primary eye care training to different stakeholders.
- Explain the theories, principles and components of health care management.
- Identify the different levels of eye health human recourse in Nepal and describe the functions of the eye health human recourse in developing world.
- Familiarize with basics of research methodology.

Course Content:

Theory

Part-I (Community Health)

Primary Health Care and its Scope **60 Hrs.**

Unit 1: Health care of people: Concept of health **15 Hrs.**

1.1 Concept of health as given by Alma-Ata declaration/WHO – Primary health care, its definition and elements

1.2 Characteristic features of physically, mentally and socially healthy person with examples

1.3 Elements of PHC

1.4 Essential health care services

1.5 PHC related national health programs/eye care programs

1.6 Measurement of Disease Burden-Method of measuring disease burden in community (Magnitude, prevalence, incidence, endemicity, epidemic and social burden and financial burden)

Unit 2: Health and its determinant **15 Hrs.**

2.1 Definition of health

2.2 Determinants of health and relation of particular determinant to a disease/health problem with example.

2.3 Promotive, preventative, curative and rehabilitative scope of health care.

2.4 Definitions of the levels of health care (primary, secondary and tertiary)

2.5 Concept on prevention.

2.6 Categorization of levels of prevention with examples.

Unit 3: Community participation in health care **15 Hrs.**

3.1 Description and importance of community participation in health care with examples.

3.2 Components of community participation.

Unit 4: Planning and priority setting in health **15 Hrs.**

4.1 Mentioning of health status, health/eye health status indicators and basic health profile of Nepal.

4.2 Setting priority in eye health with available information and eye/health indicators.

4.3 Health care priority setting: principles, method and challenges

4.4 Prevalence and incidence of blindness and visual impairment in Nepal

4.5 Prevalence of blindness and visual impairment at global and neighboring country/SAARC

International Eye Health

Unit 5: International Eye Health **20 Hrs.**

Sustainable Development Goals (SDG), WHO Action Plan, WHO and IAPB eye health strategies at global and regional level

1.7 Brief explanation of history, background, goals and target of Sustainable Development

- Goals (SDG).
- Principles and goals of the "SDG" program
- Vision of SDG given by UNDP

1.8 Relation between SDG and eye health

Part -II (Research Strategy and community diagnosis)

Unit 6: Basic research methodology **25 Hrs.**

1 Definition, types and importance of research

2 Type of research carried out in eye health and its survey methodology.

3 Difference between observational and experimental research

4 Enumeration sampling procedure

5 Source and type of data

6 Differentiate Qualitative and quantitative research method

7 Types of data collection methods

8 Rapid method and in-depth method and different types of tools for data collection-using available information, interview, observation, focus group discussion etc.

9 Data editing, coding, recoding, classification, data entry, cleaning, summary: tabulation (frequency analysis, mean median, mode and graph).

10 Conclusion, summary and recommendations based on the findings

Practical **105 hrs**

Assessing health needs (Community Diagnosis) **80 Hrs.**

1 Perform community diagnosis and present findings.

2 Plan, implement and evaluate micro eye health project.

3 Work on field for minimum one weeks.

Community diagnosis (field study/practical) **25 Hrs.**

1 Conduct Field Study on various eye health issue and problems in particular community and Prepare reports.

2 Identify an existing eye health problem in particular community.

3 Plan and preparation of field study in community.

4 Write Report based on prescribed format.

5 Apply Methodology for field study.

6 Analyze data, summary, conclusion and recommendation study.

Recommended Books

- Park, K. *Park's textbook of preventive and social medicine* (Current ed.). Jabalpur, India: M/S Banarasidas Bhanot.
- World Health Organization. *Global action plan*. WHO Publications.
- Nepal Netra Jyoti Sangh. *Epidemiology of blindness in Nepal*. NNJS Publications.
- Ministry of Health and Population. (2011). *Midterm evaluation of eye care services in Nepal*. MoHP Publications.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
Unit Hours	15	15	15	15	20	25	105
Marks	11	11	11	11	16	20	80

Third Year

Subjects

1. Ocular Disorder- II
2. Community Ophthalmology-II
3. Low Vision and Optical Dispensing
4. Clinical Practice- I (OPD Based)
5. Clinical Practice- II (OT Based)
6. Clinical Practice- III (Community Based)

Ocular Disorder –II

Total Hours: 10 Hrs. /week
Theory Hours: 10 Hrs. /week
Practical Hours: 0 Hrs. /week

Course Description

This course enables the students to deal with the different mechanical and non-mechanical injuries regarding their clinical features, diagnosis and treatment modalities. This course also guides students to perform first aid management and the urgent referral for the case for surgical management. This course also gives knowledge about the different causes of sudden loss of vision, its clinical features and management.

Course objectives

At the end of the course, the students will be able to:

- Perform the history taking, clinical examination, diagnosis and provide the available treatment.
- Decide to perform the referral in cases of ocular trauma (both mechanical and non-mechanical).
- Gain the sound clinical knowledge as they can be competent enough for the various primary treatment of the different eye conditions especially related to the eye.

Theory **70 Hrs.**

Unit 1: Closed globe injury **28 Hrs.**

Mechanical injuries

1.1 Extra ocular foreign body: Conjunctival , corneal
1.2 Blunt trauma: mode of injury, mechanism of injury
1.3 Classification of blunt trauma
1.4 Ocular findings of blunt trauma,
1.5 Initial management and referral of cases of blunt trauma
1.6 Lid and adenexal injury: Contusion, laceration
1.7 Fractures of orbit- clinical features, diagnosis and referral

Unit 2: Open globe injury –I **12 Hrs.**

2.1 Perforating eye injuries: corneal, scleral and corneo-scleral

2.2 Perforating eye injuries with/ without retained intraocular FB-clinical features, diagnosis and referral

2.3 Non mechanical injuries

2.3.1 Chemical injury – acid/ alkali

2.3.2 Thermal

2.3.3 Electrical

2.3.4 Radiational

Unit 3: Open globe injury –II **10 Hrs.**

1.1 Signs and symptoms of Perforating eye injuries corneal, scleral or corneo-scleral.

1.2 Signs and symptoms of Perforating eye injuries with or without retained intraocular FB

1.3 Non mechanical injuries

3.3.1 Clinical features, grading and management of chemical injuries.

3.3.2 Clinical features and treatment of thermal injuries.

3.3.3 Clinical features and treatment of Electrical injuries.

3.3.4 Clinical features and treatment of Radiational injuries.

Unit 4: Sudden loss of vision **20 Hrs.**

4.1 Causes of Sudden loss of vision

4.2 Sudden loss of vision

4.2.1 Clinical features and management of Retinal detachment.

4.2.2 Clinical features and management of Endophthalmitis.

4.2.3 Clinical features and management of CRAO.

4.2.4 Clinical features and management of acute angle closure glaucoma.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**Total**
Unit Hours	28	12	10	20	70
Marks	16	6	6	12	40

Community Ophthalmology-II

Total Hours: 15 Hrs. /week
Theory Hours: 10 Hrs. /week
Practical Hours: 5 Hrs. /week

Course Descriptions

Part I (Foundations of Health Education and Health Promotion)

This course teaches the educational aspects of public health management, which is an indispensable component for preventive health, a chief responsibility primary eye care personnel. The course teaches the concepts and theories of health behaviours and the procedure for planning, implementation and overall management of eye/health education program. The aim of this course is to develop the necessary skills for effective application of health education at primary level of eye care services.

Part II (Health Care Management)

This course introduces the student to concepts about management of health care services, as it applies to the operations of an eye centre and community eye hospital. This course teaches about the fundamental principles of management, eye centre management, health care system in Nepal, National eye health policy and programmes, eye health human recourse in Nepal, professional ethics and health related laws.

Course objectives

At the end of the course, the students will be able to:

- Appreciate the significance of health education and health promotion in preventive, promotive, curative and rehabilitative health care.
- Identify and apply the theories and principles of health behavioral sciences in the process of Health education.

- Identify, select and utilize suitable health education and health promotion methods and media for successful implementation of health service programs.
- Plan, implement and evaluate health education and health promotion programs.
- Explain the theories, principles and components of health care management
- Identify the different levels of eye health human recourse in Nepal and describe the functions of the eye health human recourse in developing world
- Explain the code of ethics of the Ophthalmic Assistant

Theory **70 Hrs.**

Course Part I: Foundations of Health Education and Health Promotion.

Unit 1: Introduction to health education **4 Hrs.**

Overview of health education

1.1 Aims of health education.

1.2 Factors influencing health and health education (Heredity, Environment, Life style, Socio- economic and cultural condition, Health services, Geographical and environmental factors)

1.3 Significance of health education in preventive, promotive, curative and rehabilitative health care

1.4 Example of how health education prevents & cure disease

Unit 2: Principles and scope of health education **4 Hrs.**

2.1 Scope and principle of health education with examples.

2.2 Responsible health personnel responsible for health education and how the ophthalmic assistant can promote health education at the primary eye care center

Unit 3: Methods and Media of Health Education **12 Hrs.**

3.1 Different methods of health education

3.1.1 Individual method

3.1.2 Group methods: Group discussion, Field trip demonstration, Role-play, brainstorming, symposium, workshop and mini-lecture

3.1.3 Use of audio and visual aids.

3.1.4 Methods for providing education to large groups of people- Mass method: Lecture, Exhibition, Campaign

3.2 Introduction and description of advantages and disadvantages of the different types of health education media. Meaning of each media:

3.2.1 Audio aids: radio cassette player.

3.2.2 Visual aids: poster, pamphlet, flip chart, model, real objects, bulletin board, wall chart, flannel graph.

3.2.3 Audio visual aids: TV, multimedia projector

3.2.4 Social media

3.2.5 Criteria for the selection of media

3.2.6 Measures to use each media effectively

Unit 4: Fundamental Factors of Health Education **22 Hrs.**

Communication

4.1 Definition, Scope, Importance, Principles and types

4.2 Basic elements of communication

4.3 Ways of communication.

4.4 Methods of communication

4.5 Barriers of communication.

Health education material

4.6 Description of Materials for providing education, Identify the advantages and disadvantages of each material.

Implementation of Health Education Programs

4.7 Health education methods, Media and Material

Motivation

4.8 Definition and theories of motivation with example

4.9 Principles of motivation.

4.10 Maslow's theory of human motivation**.**

Learning

4.11 Definition and steps of the learning process.

4.12 Discuss factors which increase or decrease learning.

4.13 Describe the different ways of learning.

- Learning by hearing.
- Learning by seeing.
- Learning by doing
- Learning by repetition
- Learning by imitation

4.14 Factors affecting increasing or decreasing learning.

4.15 Factors affecting learning:

- Biological factors such as age, condition of sensory organs.
- Physical factors
- Socio-cultural factors
- Psychological factors

Unit 5: Health Promotion **6 Hrs.**

5.1 Define the term health promotion.

5.2 Scope and principle of health promotion.

Course Part II: Health Care Management **22 Hrs.**

Unit 6: Health Care Management

6.1 Introduction and principle of health care management

6.2 Explain process, purpose and types of eye care planning system

6.3 Eye care system at various level in Nepal

6.4 Managing eye care centre, staffing, budgeting, inventory and logistics management and reporting

6.5 Describe the role of various eye health human resource in Nepal (EHHR positions in Nepal: Ophthalmologist, Optometrist, Ophthalmic officer, Ophthalmic assistant, Eye Health Worker, Eye healer, Lab Technologist, Ocularist, Optical Dispenser, Counsellor, Pharmacy Assistant and Pharmacist)

6.6 Describe importance of Health Care Management Information System (HMIS) and medical records

6.7 Explain health care related law, code of ethics and health professional council registration

Practical

Foundations of Health Education and Health Promotion 20 Hrs.

1. Demonstrate individual methods of providing health education with Interview, counselling
2. Demonstrate group methods of providing health education with group discussion, field trip demonstration, role play, brainstorming, symposium, mini lectures, and workshop
3. Demonstrate mass methods of providing health education via lectures and exhibition
4. Prepare materials for health education: Poster, Pamphlet, Flip chart and Flannel graph
5. Collect health education materials from different Organizations.
6. Apply the theories and principles of motivation in the process of health education.
7. Explain/ Present how you might encourage a person to operate the cataract by applying the principles of motivation.

6. Apply a theory of motivation to a health education class on ophthalmic care.

Health Care management: 15 Hrs.

Students will perform at least following performance in class room settings.

8. Write an official letter (invitation, demand for commodity, leave and submission letter)
9. Prepare a duty roster
10. Prepare a weekly/monthly report of eye centre
11. Prepare the tools for supervision

12. Prepare a monitoring tool
13. Prepare a evaluation tool-
14. Prepare simple budget sheet
15. Prepare a sample job description
16. Make a goods register
17. Leave and process of having leave at eye centre level
18. Prepare sample stock book

Recommended Textbooks

- Park, K. *Textbook of preventive and social medicine* (Current ed.). Jabalpur, India: M/S Banarasidas Bhanot.
- Pradhan, H. B. (1995). *A textbook of health education*. Educational Resources for Health.
- Park, J. E., & Park, K. (1997). *Textbook of social and preventive medicine* (20th ed.). Banarasidas Bhanot.
- World Health Organization. *Global action plan*. WHO Publications.
- Ministry of Health and Population. *National eye health policy*. MoHP.
- World Health Organization. *World report on vision*. WHO.
- International Agency for the Prevention of Blindness. *IAPB vision atlas*. IAPB.
- Nepal Netra Jyoti Sangh. *Epidemiology of blindness in Nepal*. NNJS Publications.
- Sapkota, Y. D. *Cataract surgical outcome and predictors of outcome in Lumbini Zone and Chitwan district of Nepal*.
- Ministry of Health and Population. (2011). *Midterm evaluation of eye care services in Nepal*. MoHP Publications.

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
Unit Hours	4	4	12	22	6	22	70
Marks	2	2	7	12	3	14	40

Low Vision and Ophthalmic Dispensing

Total Hours: 15 Hrs. /week
Theory Hours: 10 Hrs. /week
Practical Hours: 5 Hrs. /week

Course Description

This course provides the students with knowledge and skill on low vision and ophthalmic dispensing. This course is designed to develop basic but comprehensive knowledge on clinical and functional assessment and rehabilitation of low vision clients and basic ophthalmic dispensing procedures.

Course Objectives

After completion of this course, students will be able to:

- Define and understand the meaning and epidemiology of low vision and visual impairment.
- Describe the different causes of low vision and visual impairment.
- Assess the visual performance of the patients with low vision
- Describe different types of optical and non optical devices.
- Perform clinical assessment, functional assessment and rehabilitation of low vision clients.

Course Contents

Theory **70 Hrs.**

Low Vision

Unit 1: Low vision and visual impairment **6 Hrs.**

1.1 Definition and category of visual impairment
1.2 Definition and causes of low vision
1.3 Classification of functional visual deficit in low vision

Unit 2: Low Vision devices (Advantages, disadvantage and procedure) **5 Hrs.**

2.1 Near optical devices, far optical devices and non-optical devices

Unit 3: Special Investigations to be considered **5 Hrs.**

3.1 Special investigations/tests in Low Vision patients\ (VA, VF, CS, CV, refractive procedures)

Unit 4: General approach to low vision patient and management **6 Hrs.**

4.1 Observation, history taking and approach to a patient with low vision

4.2 Basic knowledge on management options of patients with low vision

VA: Visual Acuity, VF: Visual Field, CS: Contrast Sensitivity, CV: Color Vision

Optical dispensing

Unit 5: Lens measurement **16 Hrs.**

5.1 Monocular and binocular IPD measurement with scale and IPD ruler with pupilometer/Digital Device. 2

5.2 Identification of optical center and marking with lensometer and without lens meter -1hour)

5.3 Determination of lens power by lensometry

5.4 Determination of lens power by hand neutralization-2 hour

Unit 6: Frame, lens material and lens design **22 Hrs.**

6.1 Properties of Ophthalmic lens

6.2 Frame types and nomenclature of frames.

6.3 Relationship between frame, lenses and face shape

6.4 Selection of frame on basis of occupation and age

6.5 Lens materials and design (Identification of Biconvex, Biconcave, Meniscus, plano convex and plano concave lens)

6.6 Edging importance and role of edging for the proper fitting.

6.7 Tints and coating of lens surface and its application

6.8 Absortive lens and filters

6.9 Ophthalmic prisms, dispensing and referral

Unit 7: Dispensing bifocal and progressive addition lens **10 Hrs.**

7.1 Introduction to bifocal lens, types and dispensing.

7.2 Introduction to progressive addition lens, lens marking, advantages and disadvantages.

7.3 Frame selection and fitting measurement for progressive addition lens.

Practical: **35 Hes**

Low vision **17 Hrs.**

1 Identify low vision devices (Near Optical Devices- 3 hours)
2 Identify low vision devices (Far Optical Devices- 2 hours)
3 Identify low vision devices (Non- Optical Devices- 2 hours)
4 Perform history taking of patients (2 hours)
5 Perform investigations/workouts for low vision patients (2 hours)
6 Perform patient handling/counseling and management (5 hours)
7 Visit to blind school and rehabilitation centres (1 hr)

Optical Dispensing **18 Hrs.**

8 Measure IPD (Monocular and binocular IPD measurement with scale and IPD ruler with pupilometer/Digital Device)
9 Determine lens power (Lensometry and Hand neutralization)
10 Identify optical centre and marking with lensometer
11 Identify lens coating and absorptive type
12 Identify frame and its parts

Reference Books.

- Faye, E. (1984). *Clinical low vision*. Little, Brown and Company.
- Brown, B. *The low vision handbook.*
- Brilliant, R. L. (1999). *Essentials of low vision practice*. Butterworth-Heinemann

Final written exam marking scheme

Unit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Unit Hours	6	5	5	6	16	22	10	70
Marks	4	3	3	4	8	12	6	40

Clinical Practice –I

(OPD Based)

(Patient Examination and Diagnosis, Counseling, Vision, Refraction, Low Vision, Orthoptic)

Total: 11 weeks

Course Description

Clinical Practice –I is a 440 hours (11 weeks) program that aims to provide students an opportunity for meaningful career related experiences by working fulltime in real organizational settings where they can practice and expand upon their classroom based on knowledge and skills before graduating. It will also help students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks. The course is designed to expose the students to develop the skills on general and ocular history taking, visual acuity measurements and refraction. This also provides exposure to different ocular pathological conditions and their management. It also provides additional skills on different types of binocular vision anomalies and vision therapy followed by low vision assessment. The student will be eligible for Clinical Practice-I only after the completion of all classes of the subjects included in the curriculum. Clinical Practice-I should be completed at least 2 weeks before the start of 3rd year final examination of CTEVT. The institute will make arrangement for Clinical Practice-I. The institute will inform the CTEVT at least one month prior to the Clinical Practice-I placement date along with plan, schedule, the name of the students and their corresponding Clinical Practice-I site.

Course objectives

At the end of the course, the students will be able to:

- Assess visual acuity
- Perform objective and subjective refraction
- Diagnose and managing ocular disease
- Refer if required
- Assess binocular vision and vision therapy
- Assess low vision and rehab

Activities

1. Vision- 80 Hours (2 weeks)

Students will be posted in vision room where they can learn different types of visual acuity tests for distance and near. This practice unit on vision is intended for developing skills on Visual Acuity (VA) for distance and near with and without correction.

2. Refraction - 120 Hours (3 weeks)

Students will be posted in refraction unit where they can learn different methods of objective and subjective refraction. This practice unit on refraction is intended for developing skills on objective refraction and subjective refraction.

3. Patient Examination and Diagnosis, Counseling- 120 Hours (3 weeks)

Students will be posted in examination room where they can learn General and ocular history taking, perform blood pressure measurement, SPO2 measurement, Respiratory Rate Measurement, Pulse Measurement, Torch light examination, Slit lamp Biomicroscopy, Distance Ophthalmoscopy, Direct and Indirect Ophthalmoscopy, Patient counseling and Patient referral. This practice unit on patient examination, diagnosis and counseling is intended for developing skills on History taking, general ocular examination, Diagnosis and management and Counseling and Referral.

4. Low vision- 20 Hours (1 weeks)

Students will be posted in examination room where they can learn, General and ocular history taking, Torch light examination, Slit lamp Biomicroscopy, Distance Ophthalmoscopy, Direct and Indirect Ophthalmoscopy, Patient counseling and Patient referral. This practice unit on low vision is intended for developing skills on Low vision history taking, Ocular examination, Low vison devices, Optical and non- optical devices and Low vision rehabilitation.

Unit 5: Orthoptics- 40 Hours (2 weeks)

Students will be posted in Orthoptics room where they can learn, Assessment of EOM, Cover test, Measurement of convergence and accommodation, Measurement of Prism fusional ranges, Assess grades of binocular vision and Vision therapy. This practice unit on orthoptics is intended for

developing skills on EOM, Cover test, Convergence, Accommodation, Stereopsis and Fusional vergence range.

Evaluation

Attendance and quality of participation 25%

Case reports (numbers and qualities) 30%

Clinical live skill demonstration: In all 3 given areas 45%

Total: 100%

Recommended Texts

- Comprehensive ophthalmology; A.K. Khurana, 6th edition
- Theory and practice of optic and refraction; A.K. Khurana, 3rd edition
- Clinical orthoptics; Fiona J. Rowe, 3rd edition
- Strabismus Simplified; Pradeep Sharma, 2nd edition
- Low visions aids; Monica Chaudhary
- Primary care optometry; Theodor Grosvenor, 5th edition
- Clinical optics; Fannin TE and Grosvenor, 2nd edition
- Essentials of low vision practice; Richard L. Brilliant
- Binocular vision and ocular motility; Von Noorden, 5th edition

Clinical Practice-II

(OT Based)

(8 weeks)

(Ocular procedures and Investigations, Ocular Anesthesia, Assist in Surgery, Preoperative Postoperative Management and Sterilization).

Course Description

Clinical Practice –II is a 320 hours (8 weeks) hospital-based program that aims to provide students an opportunity for meaningful career-related experiences by working full-time in real hospital settings where they can practice on ocular anesthesia and manage pre-operative/ post-operative patients of ocular surgery. Students can also expand upon their classroom-based knowledge and skills before graduating by assisting in the different ocular surgery. At the end of this practical session, students will be demonstrated preparation processing setting and autoclaving different ocular surgery instruments, linen etc.

The student will be eligible for Clinical Practice-II only after the completion of all classes of the subjects included in the curriculum. Clinical Practice-II should be completed at least 2 weeks before the start of 3rd year final examination of CTEVT. The institute will make arrangement for Clinical Practice-II. The institute will inform the CTEVT at least one month prior to the Clinical Practice-II placement date along with plan, schedule, the name of the students and their corresponding Clinical Practice-II site.

Course Objectives:

Course Contents: Practical

Unit 1. Preoperative and Postoperative management 80 Hrs. (2 weeks)

1.1 Preoperative management

1.1.1 Prepare patients according to surgical procedure

1.1.2 Check and record vital signs.

1.1.3 Explain the surgical procedure.

1.1.4 Counsel the patients.

1.1.5 Review the check list.

1.1.6 Take legal consent.

1.1.7 Perform Pre-operative teaching

1.1.8 Conduct physical preparation including parts of eye

1.2 Postoperative management

1.2.1 Receive patient safely from OT

1.2.2 Conduct immediate recovery care to the patient

1.2.3 Start medicine according to order

1.2.4 Explain post-operative instruction

1.2.5 Conduct close observation of operation site

1.2.6 Discharge patients

Unit: 2. Ocular procedure (Ocular anesthesia) 80 Hrs. (2 weeks)

2.1 Topical Anesthesia

2.1.1 Prepare medicines and patient

2.1.2 Explain the procedure of anesthesia

2.1.3 Instill anesthetic drop/ointment

2.1.4 Manage complications.

2.2 Local anesthesia (50 Cases)

2.2.1 Retrobulbar Anesthesia

- Prepare medicines and patient
- Explain the procedure of retrobulbar anesthesia
- Administer the retrobulbar injection
- Manage complication

2.2.2 Peribulbar anesthesia

- Prepare of medicines and patient
- Explain the procedure of peribulbar anesthesia
- Administer the peribulbar anesthesia
- Manage complication

2.2.3 Infiltrative anesthesia

- Prepare medicines and patient
- Explain the procedure of infiltrative anesthesia
- Administer the infiltrative anesthesia
- Manage complication

2.2.4 General Anesthesia

- Introduce GA
- Familiarize with different equipment used in GA

Unit. 3. Assist in the Surgery- **120 Hrs. (3 weeks)**

3.1 Perform scrubbing and hand washing

3.2 Prepare yourself and patients

3.3 Prepare trolley

3.4 Arrange the instruments and consumables

3.5 Set up machine if required

3.6 Assist surgeon

Minimum number of ocular surgeries to be assist :(90 cases)

- Cataract -SICS (28 cases)
- Cataract –Phacoemulsification (20 cases)
- Glaucoma Surgery (5 cases)
- Nasolacrimal duct passage surgery (5 cases)
- Squint surgery (5 cases)
- Keratoplasty (3 cases)
- Vitrectomy (3 cases)
- Retinal detachment (2 cases)
- Ptosis and reconstruction (2 cases)
- Orbitotomy (2 cases)
- Enucleation (2 cases)
- Evisceration /Exenteration (2 case)
- Excision biopsy (4 cases)
- Epilation (2 cases)

- Pterygium (5 cases)

Unit: 4. Sterilization **20 Hrs. (1 weeks)**

4.1 Prepare instruments, linen and utilities

4.2 Set up instruments according to ocular surgeries

4.3 Autoclave the instruments (Steam/electric/gas)

4.4 Store and deliver sterile instruments

Evaluation

Attendance and quality of participation 25%

Case reports (numbers and qualities) 30%

Clinical live skill demonstration: In all 3 given areas 45%

Total: 100%

Clinical Practice –III

(Community Based)

(Diagnosis and screening camp, surgical camp, school screening, and district/Community/primary eye care centers/ Hospital)

(9 weeks)

Course description

Clinical Practice –III is 360 hours (9 weeks) community based program that aims to provide students an opportunity for meaningful career related experiences by working fulltime in real holistic approach. It deals with managing patient having eye problem in the eye centre and mobile community outreach program, including examination, investigation, counseling and explanation of treatment procedure.

The student will be eligible for Clinical Practice-III only after the completion of all classes of the subjects included in the curriculum. Clinical Practice-III should be completed at least 2 weeks before the start of 3rd year final examination of CTEVT. The institute will make arrangement for Clinical Practice-III. The institute will inform the CTEVT at least one month prior to the Clinical Practice-III placement date along with plan, schedule, the name of the students and their corresponding Clinical Practice-III site.

Activities

Unit 1: Observe and perform the job with or without supervision in Outpatient Clinic: 40 Hrs. (1 week)

- Registration and reporting
- Visual acuity test and Refraction
- Eye Examination and Treatment
- Procedure room
- Imparting Health Education
- Maintain Referral Procedure for further treatment

Unit 2: Observe and perform the job under with or without supervision in Ocular investigations department: 80 Hrs. (2 week)

- Intra-Ocular Pressure Measurement

- Lacrimal Syringing Test
- Corneal Flurescein strip test
- Schirmer Test
- Color Vision
- Ophthalmoscopy (Direct and Indirect)
- Biometry
- Visual field examination
- Ophthalmic Photography

Unit 3: Observe and perform other support service: 40 Hrs. (1 week)

- Counseling
- Spectacle dispensing (edging, fitting)
- Pharmacy (Medical dispensing)
- Maintain Medical and non-medical supplies (Inventory and logistics Management)

Unit 4: Observe and perform the job under supervision in various department of In-patient Department: 40 Hrs. (1 weeks)

- Admission of patient
- Consent perform preparation
- Prepare patient for surgery
- Check required investigation and preoperative management
- Postoperative management
- Patient discharge
- Recording

Unit 5: Observe and perform the job under supervision in various department of Operating Theatre: 80 Hrs. (2 weeks)

- OT running and record keeping
- Receive the patient in OT and check the patient readiness for surgery
- Preoperative management in OT
- Local Anaesthesia (Topical and Injections)
- Assist unscrub and scrub (Sterile)

- Instrumentation and sterilization
- Operate OT equipment
- Perform extra ocular minor surgeries
- Pad and bandage
- Recovery of the patient
- Immediate postoperative management
- OT fumigation and preparation
- Maintain OT record and prepare periodical report

Unit 6: Observe and perform the job under supervision in various management activities of Outreach Community Eye Program: 80 Hrs. (2 week)

- Describe Supervision, Monitoring and Evaluation of community eye health program
- Instrument/Equipment Maintenance
- Meeting and Minutes with stakeholders
- Prepare periodic report of the activities
- Maintain Communication with community base organizations
- Maintain a safe and healthy environment

DST (Diagnostic, Screening and treatment) Camps:

Surgical Eye Camps:

School Children Screening Program:

District/Community/primary eye care centers:

Evaluation

Attendance and quality of participation	25%
Case reports (numbers and qualities)	30%
Clinical live skill demonstration: In any 3 given areas	45%
Total:	**100%**

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