



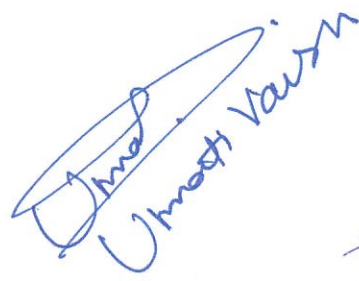
अटल बिहारी वाजपेयी मेडिकल यूनिवर्सिटी उत्तर प्रदेश
Atal Bihari Vajpayee Medical University Uttar Pradesh

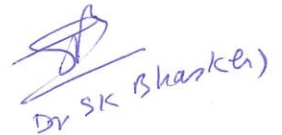
Ordinance & Curriculum Of Master of Optometry (M.Optom)

(In accordance with the "Model Curriculum of Optometry" circulated by Allied Health Section, Ministry of Health and Family Welfare, Govt. of India)


कुलपति


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Background of the Optometry profession

An estimated 456 million people of India's population of 1.12 billion people require vision correction (spectacles, contact lenses or refractive surgery) to be able to see and function for learning, work and life in general. Twenty six million people are blind or vision impaired due to eye disease. A further 133 million people, including 11 million children, are blind or vision impaired simply from lack of an eye examination and an appropriate pair of glasses (uncorrected refractive error).

Blindness and vision impairment place a significant economic burden on families, communities and society at large – due to lost productivity, as well as the cost of education and rehabilitation. About 85% of all vision impairment and 75% of blindness globally could be avoided, prevented or cured if the appropriately trained personnel and care facilities existed. The World Health Organisation (WHO) and the International Agency for the Prevention of Blindness (IAPB) launched the global initiative VISION 2020: the Right to Sight to eliminate avoidable blindness and vision impairment.

Uncorrected refractive error is the major cause of avoidable vision impairment, and the second most common cause of blindness. *"Without appropriate optical correction, millions of children are losing educational opportunities and adults are excluded from productive working lives, with severe economic and social consequences. Individuals and families are pushed into a cycle of deepening poverty because of their inability to see"*.

In 2007, an estimated 456 million people of India's population of 1.12 billion people required vision correction (spectacles, contact lenses or surgery) to be able to see and function for learning, work and general life activities. This included 37 million children younger than 16 years of age. Almost all of these 456 million adults and children would have normal vision if they had access to an eye examination and an appropriate pair of spectacles. However, lack of access has left 133 million of them, including 11 million children, blind or vision impaired from uncorrected refractive error.

The burden of avoidable blindness and vision impairment on the health care system in India is significant, with India currently having the highest number of blind people in the world. The direct and indirect cost, including lost productivity, due to uncorrected refractive error in India has been estimated at \$23 billion per year (\$269 billion globally). As the population ages, future demand for eye care services will increase substantially. Enhancing access to these services will require an increase in the number of eye care professionals, as well as more efficient utilization of existing professionals.

Optometry is recognized by the World Health Organization (WHO) as an independent profession through its ongoing official relations with the World Council of Optometry (WCO) – the international optometric organization which represents almost 300,000 optometrists from 87 member organizations in 47 countries.

Optometry as a profession has the primary public health responsibility for eliminating uncorrected refractive error. To provide excellent vision care to all the people of the country, India needs 116,000 optometrists. India currently has approximately 9,000 4-year trained optometrists and an estimated 30,000 2-year trained eye care personnel.



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About Optometry

Optometry means a health care profession that is autonomous and concerned especially with examining the eye for defects and faults of refraction, with prescribing correctional lenses, eye exercises and/or visual rehabilitation care for visually impaired, with diagnosing diseases of the eye, and with treating such diseases or referring them for treatment.

Optometry as a profession has the primary public health responsibility for eliminating uncorrected refractive error (the leading cause of vision impairment globally). As primary eye care practitioners, optometrists have a vital role in detecting potentially serious eye diseases such as cataract, glaucoma and Diabetic retinopathy, age-related maculopathy, as well as general health conditions such as hypertension and diabetes, which means optometrists can also help alleviate the burden of other causes of blindness through diagnosis, referral and in some cases co-management. Optometry can and should play a leading role in eye care provision at the primary level, and can also assist at secondary and tertiary levels where possible, working with ophthalmologists and other eye care providers towards the unified goal of combating blindness.

Nomenclature based on career progression for Optometrist (as per UGC/ UP State AHC)

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	Academic	Industry/ Management	
Level 4	Ophthalmic Assistant			• Diploma with 0 - 5 years' experience post Diploma
Level 5	Junior optometrist	Clinical Instructor	Optometrist / Junior Manager	• B. Optom (or equivalent) .With more than 5 years of experience based on the performance of the individual as evaluated by the head of the department, promotion to the next one level possible.
Level 6	Consultant Optometrist	Assistant Professor 1	Skill development officer/Manager	• M. Optom /M Sc optom/ MPhil Optom/Equivalent (0-2 years experience)
Level 7	Senior consultant Optometrist	Assistant Professor 2	Project officer/Manager	• M. Optom/M Sc optom/ MPhil Optom/Equivalent (3-6 years' experience)
Level 8	Chief consultant Optometrist	Associate Professor	Project Manager/Chief Optometry Manager	• M Optom/M Sc optom/ MPhil Optom/Equivalent (7- 10 years experience, PhD desirable/not mandatory)
Level 9	Associate Director	Professor	Senior Project Manager	• M Optom/M Sc optom/ MPhil Optom /Equivalent (11-14 years experience, with PhD desirable not mandatory)*
Level 10	Director	Principal/ Dean/ Director	Director	• M. Optom/M Sc optom/ M Phil Optom/Equivalent (15 years or more of experience) with PhD *

Note: Clinical cadre needs clinical experience, academic needs teaching/ research experience and industry can have either clinical/teaching experience with managerial skills based on the need.

* In absence of PhD or desirable experience post qualifications specified, the rules can be relaxed for initial 10 years. On Job upgradation of degree may be considered as mandatory till the profession has enough numbers to fulfil the requirements. M.Optom/Equivalent will still remain to be mandatory requirement for academic positions.

According to International standard classification of Occupations (ISCO -08, Volume-I, International Labour Office, Geneva, 2012, Page 13,14), Optometry is classified under occupations (Major Group : Professionals(2); Sub Major Group : Health Professionals(22); Minor



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Group : Other Health professionals (226) ; Unit Group : Optometrist (ISC code-2267)) at Skill Level4 typically involving the performance of tasks that require complex problem-solving, decision making and creatively based on an extensive body of theoretical and factual knowledge in a specialised field.

Such skill are usually obtained as the result of study at a higher educational institution for a period of 3-6 years leading to the award of a first degree or higher qualification (ISCED-97 Level 5 or higher)

Teaching faculty, staff and infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure (College & Hospital) and the teaching staff must be adequate and as per the latest norms of the UP State Allied & Healthcare Council.

Teaching areas should facilitate different teaching methods. Where students may share didactic lectures with other disciplines large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues where students are placed the health and safety standards must be adhered to.

It is recommended that a faculty and student ratio of **1:3** to be followed in clinical training and practical. The teaching load and pay-scales as well as leave rules will be based on the latest UGC norms for the designated post. The promotion avenues for each designation will be purely based on latest UGC CAS (Career Advancement Scheme) norms.

For 60 seats intake:

S.No.	Designation of the faculty Position	No. of Faculty
1	Professor	02
2	Associate Professor	02
3	Assistant Professor	06
Total		10

The required non-teaching (Technical & Administrative) staff shall be as per the latest norms of the UGC/ UP State Allied & Healthcare Council.

Job availability

As per ILO documentation, employers worldwide are looking for job applicants who not only have technical skills that can be applied in the workplace, but who also can communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work. Graduates can expect to be employed in hospitals and private practices as Optometrist. A career in research, following the completion of a higher degree such as a PhD, is an option chosen by some graduates. Also, graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded. With further experience, graduates may also be employed by equipment manufacturers and development specialists.

Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years and will keep on increasing due to chronic conditions.

Job Opportunities:

The job sectors for optometrist can be divided into the following areas:

1. Corporate sector
2. Private practice
3. Work for an optical chain or under an optical store
4. Public health
5. Industries/companies
6. Eye care hospitals & institutions
7. Education sector
8. Scientific research
9. Basic research and integrated professional areas



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Corporate Sector:

Optometrists are employed as professional service people under various lens manufacturing companies as well as contact lens companies. Some pharmaceuticals and surgical instrument companies (eye related) also employ them. Depending on performance there is a career path for the professional service staff and some optometrist have also risen to regional heads (Asia-pacific head).

Private practice:

Optometrist upon graduation can open their optometry clinic with/without optical store. Currently many optometrists are practicing in their own clinic.

Work for optical chain:

The work environment and the responsibilities for working in a chain would be similar to that of a private practitioner.

Public Health:

Optometrist can also enter into the public health domain as health care providers. They could be involved in epidemiological studies, in primary health centres (PHC) and in SHC. Optometrists can collaborate with NGO in service delivery of health care.

Industries/ Companies:

Optometrist can involve in pre-employment vision screening, periodic eye check-up for employees, set vision standards for various occupations, help in occupational health professional in developing eye safety policy of the company, advise on appropriate eye safety wear and can do awareness campaign among the employees especially on the usage of eye safety wear and protection.

Eye Care Hospitals & Institutions:

Optometrists can provide vision care services like prescribing glasses, contact lens, provide comprehensive low vision care services, advice on vision therapy etc. They can also provide extended role in various eye clinics like managing diagnostic services and co-manage patients in an eye care institutional set up or a hospital set up. Optometrist also acts as clinical trainer, researchers, administrators and clinical heads.

Educational Sector:

Optometrists can be employed as faculty depending on experience and qualification. Optometrists also can head optometry schools or college. Academics can also be combined with clinical practice.

Research:

Research areas in optometry are quite vast ranging from optics, contact lenses, binocular vision, glaucoma, retinal diagnostics, public health, low vision to primary eye and health care. Optometrists can involve themselves in vision science researches, not restricted with any specific areas.

Translational research:

Vision scientists/ optometrists with higher degree can involve in transformational research wherein the scientific discoveries arise from laboratory, clinical or population studies lead into clinical applications to reduce disease incidence, morbidity and mortality.



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Master of Optometry



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Master of Optometry

Eligibility for admission:

Bachelor of Optometry or equivalent from a recognised university with minimum 55 % or 5.5 CGPA

Duration of the course

The M Optom post graduate degree program is of two years duration.

Duration of the course: 2 years or 4 semesters. (4th Semester is internship for 6 months)

Total hours –2310 (including clinical and research)

Semesters - An academic year consists of two semesters

Odd Semester: July to December

Even Semester: January to June

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance:

A candidate has to secure minimum-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

Assessment & Examination:

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical & clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated.

At the end of each semester, there shall be University examination.

The passing marks for every course is 50 % marks (internal & University exam taken together) in theory and practical separately.

Grace Marks:

If a candidate fails in one subject (theory only) in the University examination, five grace marks will be given to the candidate by the University before the declaration of result.

Carry forward of Marks:

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified, then he/she shall reappear for the end semester examination of that course. However, his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

Promotion Policy:

A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of all the semesters are successfully completed.

Maximum duration of the Program:

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they will be discharged from the said program.

Credit details:

1 hour lecture per week	1 credit
2hours of tutorials per week	1 credit
2 hours of clinics per week	1 credit



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DIVISION:

- Candidate will be awarded division at the end of fourth academic year as follows:
 - Distinction - 75% and above marks in any subject.
 - First division - 60% and above in the aggregate of marks of all subjects.
 - Second division- 50% or more but less than 60% in the aggregate of marks of all subjects.

DEGREE:

- The degree of M.Optom program of the University shall be conferred on the candidates who have pursued the prescribed course of study for not less than two years (including 6 months internship) and have passed examinations as prescribed under the relevant scheme.



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Curriculum Outline

First Semester-

Sl. No.	Course Titles	Hours/week			IA*	UE**	Total marks (IA+UE)	Total Credits
		L	P/C/R	Total contact hours				
MOP101	Epidemiology & Community Eyecare	30		30	50	50	100	2
MOP102	Research Methodology & Biostatistics	45		45	50	50	100	3
MOP103	Ocular Diseases and Diagnostics I	75		75	50	50	100	5
MOP104	Research Project		12		50	50	100	6
MOP105	Clinic 1 (General)		16		50	50	100	8
TOTAL		10	28	150	250	250	500	24

Total clinical+ Research hours: 420 hours

Total Hours for First semester: 420 + 150 = 570 hours

*IA –Internal Assessment (Theory + Practical) ** UE- University Examinations (Theory)/(Practicals)

Second Semester

Sl. No.	Course Titles	Hours/week			IA*	UE**	Total marks (IA+UE)	Total Credits
		L	P/C	Total contact hours				
MOP201	Ocular Diseases and Diagnostics II	45		45	50	50	100	3
MOP202	Advanced Contact lens I	30		30	50	50	100	2
MOP203	Pediatric Optometry & Binocular vision	45		45	50	50	100	3
MOP204	Low Vision and Geriatric optometry	30		30	50	50	100	2
MOP205	Research Project		12		50	50	100	6
MOP206	Clinics (General)		6		50	50	100	3
MOP207	Clinics specialty		10		50	50	100	5
TOTAL			28	150	350	350	700	24

Total Clinical+ Research hours: 420 hours

Total Hours for Second semester: 420 + 150 = 570 hours



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Third Semester

Sl. No.	Course Titles	Hours/week			IA*	UE**	Total marks (IA+UE)	Total Credits
		L	P/ C	Total contact hours				
MOP301	Advanced contact lens II	30		30	50	50	100	2
MOP302	Low vision care and rehabilitation	30		30	50	50	100	2
MOP303	Vision Therapy	30		30	50	50	100	2
MOP304	Research Project		12		50	50	100	6
MOP305	Clinics (general)		6		50	50	100	3
MOP306	Clinics (specialty)		12		50	50	100	6
TOTAL			30	90	300	300	600	21

Total clinical+ Research hours: 450 hours

Total Hours for Third semester: 450 + 90= 540 hours

Fourth Semester

Sl. No.	Course Titles	Hours/week			IA*	UE**	Total marks (IA+UE)	Total Credits
		L	P/ C	Total contact hours				
MOP401	Clinics (General)		8		50	50	100	4
MOP402	Clinics (Specialty)		20		50	50	100	10
MOP403	Research Project (Dissertation)		14		50	50	100	7
TOTAL			42		150	150	300	21

Total clinical+ Research hours: 630 hours



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First Semester

EPIDEMIOLOGY AND COMMUNITY EYE CARE

INSTRUCTOR INCHARGE: Public Health professional / Optometrist with higher degree (Master / PhD) and experience in teaching the course on epidemiology

COURSE OBJECTIVES: This course deals with the basics of ocular epidemiology and presents details on various eye diseases. It also introduces the students to the concepts of preventive measures and to inculcate the theoretical knowledge and clinical exposure of community optometry.

COURSE OUTCOMES:

1. Thorough understanding of epidemiological concepts.
2. Thorough understanding of conducting of screening for specific eye conditions, and resultant implications through theoretical and practical exposure.

TEXT BOOKS: Epidemiology of eye diseases: Johnson and Gordon

COURSE PLAN (Total : 30 hours)

1. Prevalence, incidence and distribution of visual impairment
2. Methodology
 - Basics of Epidemiology study methods
 - Types of study designs
 - Screening for visual disorders
3. Childhood blindness
4. Refractive errors and presbyopia
5. Age related cataract
6. Low Vision
7. Diabetic retinopathy
8. Glaucoma
9. Age related Macular Degeneration
10. Vitamin A deficiency
11. Corneal and external diseases
12. Prevention strategies
13. Concept of Health and Disease
14. Principles of Epidemiology and Epidemiological Methods
15. Screening for Eye Disease– Refractive errors, Low Vision, Cataract, Diabetic retinopathy, Glaucoma, Amblyopia, Squint.
16. Blindness
17. Health Information and Basic Medical Statistics
18. Communication for Health Education
19. Health Planning and Management
20. Health care of community
21. How to plan and implement Vision2020



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RESEARCH METHODOLOGY

INSTRUCTOR IN CHARGE: M.Optom/PhD/ Master of Statistics

COURSE OBJECTIVES: This course is designed to provide the students the basic knowledge in Bio-statistics. At the conclusion of the course, the students will have the knowledge of data collection, statistical application and finally, presentation of the statistical data.

COURSE OUTCOMES:

1. Ability to write research proposal/grant application
2. Ability to do statistical analysis
3. Ability to write research articles (Medical writing)
4. Ability to critically evaluate the research material

TEXT /REFERENCE BOOKS:

1. Methods in Biostatistics by B.K Mahajan
2. Probability and Statistics by Murray
3. Epidemiology of Eye Diseases, by Gordon and Drawin
4. Research Methodology by SM Israni

COURSE PLAN: (Total: 45 hours)

1. Need for Research in optometry
2. Introduction to research methods , Conducting a literature review, Research design , Sampling methods , Data collection and data collection tools , Data analysis : Quantitative and Qualitatively ,Public health research , Issues in Research .Writing skills for students
3. Introduction and method of collecting and presenting of statistical data
4. Calculation and interpretation of various measures like mean, median, standard deviations, Skewness and Kurtosis
5. Probability distribution
6. Correlation and regression
7. Significance tests and confidence intervals
8. Parametric tests –
Test for single proportion
Test for Equality of proportions
Test for single mean
Test for equality of means
9. ANOVA:-
One way
Two way
10. Non parametric tests –
Chi-square tests
Fisher's exact test
McNemar test
Mann-whitney U-test
Median test
Sign test
Wilcoxon test



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OCULAR DISEASES AND DIAGNOSTICS - I
INSTRUCTOR IN CHARGE: M. Optom/ PhD

COURSE OBJECTIVES: Evidence based approach to Diagnosis, Clinical decision Making, Management and co management of anterior segment ocular diseases. Developing more reading ability of scientific journals for more evidence based management with recent understanding of diseases.

COURSE COMPETENCIES:

1. Ability to perform clinical decision making for Ocular abnormalities
2. Ability to perform and interpret corneal diagnostics including
Topography/Pentacam/Orbscan
Specular microscopy
Pachymetry
Abberometry
AS OCT UBM
3. Ability to perform pre and post Lasik evaluation
4. Ability to interpret glaucoma diagnostic reports
OCT
HRT
GDx
Gonioscopy
ONH evaluation
5. Ability to perform anterior segment photography
6. Ability to manage and co-manage therapeutics for anterior segment
7. Referral criteria

TEXT/ REFERENCE BOOKS:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

COURSE PLAN: Total : 80 Hours

1. Refresher of anterior segment ocular diseases, diagnosis and therapeutics
2. Refresher of glaucoma diagnosis and therapeutics (specialized procedure like HFA, FDT)
3. Surgical treatment of anterior segment diseases
4. Anterior segment Diagnostics
Specular Microscopy
Topography
Corneal Hysteresis
Orbscan, Pentacam
Pachymetry
Abberometry
AS OCT, UBM
HRT



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GDx
ONH evaluation
Gonioscopy
Fluoresceinangiography
Refractive surgery
Cataract evaluation (Biometry, IOL power calculations)

RESEARCH PROJECT – Total: 180 hours

Students will prepare the protocol during this semester after doing extensive literature search. Each student will be reporting to guide/supervisor who helps the student to go about in systematically. Research proposal need to be presented in front of the experts before going ahead with data collection. In institute which has Institute research board and ethics committee student can be encouraged to present the proposal in it.

CLINICS: GENERAL: Total - 240 hours

OBJECTIVES: The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature.

Second Semester

OCULAR DISEASES AND DIAGNOSTICS – II

INSTRUCTOR IN CHARGE: M.Optom/ PhD

COURSE OBJECTIVES: Evidence based approach to Diagnosis, Clinical decision Making, Management and co management of posterior segment diseases. Developing more reading ability of scientific journals for more evidence based management with recent understanding of diseases.

COURSE COMPETENCIES:

1. Ability to perform electro diagnostic procedures and interpret electro diagnostic reports
ERG
EOG
VEP
2. Ability to perform stereoscopic fundus photography
3. Ability to use Ocular photography as tool for evidence based clinical decision making and progression analysis
4. Ability to perform posterior segment photography



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5. Ability to manage and co-manage diseases and disorders of posterior segment

TEXT/ REFERENCE BOOKS:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

COURSE PLAN: (Total: 45 Hours)

1. Refresher of posterior segment ocular diseases, diagnosis and therapeutics
2. Surgical treatment of posterior segment diseases
Posterior segment Diagnostics
ERG
EOG
VEP
OCT
Fundus photography
Neuro optometric diseases and disorders

ADVANCED CONTACT LENSES – I

INSTRUCTOR IN CHARGE: M.OPTOM/PhD/FIACLE

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the corneal oxygen requirements and recommend the best suitable contact lens for a particular condition. Management of contact lens induced ocular complications. Understand contact lens fitting for compromised corneas and keratoconus. The student should also be able to understand the fitting philosophy of orthokeratology and myopia control.

COURSE COMPETENCIES:

1. Ability to understand corneal physiology and oxygen needs
2. Ability to diagnose and manage complications due to contact lenses
3. Ability to fit specialized contact lenses
Keratoconus
Rose-K lenses
Mini scleral lenses

TEXT/ REFERENCE BOOKS:

1. IACLE modules
2. Contact lenses – Stone and Philips

COURSE PLAN: (Total: 30 hours)

1. Anatomy and Physiology of the Cornea and related Structures
2. Contact Lens Materials
3. Microbiology, Lens Care and Maintenance
4. Tears and contact lenses
5. Optics and Lens Design
6. Clinical Instrumentation in contact lens practice
7. Rigid Gas Permeable corneal lens fitting



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8. Soft contact lens fitting
9. Toric Contact lens fitting
10. Lens care regimen
11. Contact lens standards
12. Lens checking : Soft and Rigid
13. Contact lens complications
14. Special types of Contact lenses – diagnosis, surgery, protective, therapeutic, sports, partially sighted

PEDIATRIC OPTOMETRY AND BINOCULAR VISION

INSTRUCTOR IN CHARGE: M.Optom/PhD/ FCOVD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the, basic concept behind visual perception, binocular vision anomalies and management and co- management of strabismic, non-strabismic binocular vision disorders amblyopia.

COURSE COMPETENCIES:

1. Ability to diagnose and manage and co-manage binocular vision anomalies
2. Ability to co-manage visual perceptual anomalies
3. Ability to manage diplopia, suppression and ARC
4. Ability to manage amblyopia

TEXT/ REFERENCE BOOKS:

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press
3. Pediatric optometry: Jerome K Rosner

COURSE PLAN: (Total: 45 hours)

1. Refractive Development:
Early Refractive Development
Visually Guided control of Refractive State: Animal Studies
Infant Accommodation and Convergence
2. Oculomotor Function:
Conjugate Eye Movements of Infants
Development of the Vestibuloocular and Optokinetic reflexes
3. Spatial and Chromatic Vision:
Front-end Limitations to Infant Spatial vision: Examination of two analyses
Development of the Human Visual Field
Development of Scotopic Retinal Sensitivity
Infant Color vision
Orientation and Motion selective Mechanisms in Infants
Intrinsic Noise and Infant performance
4. Binocular Vision:
Development of interocular vision in Infants
Stereopsis in Infants and its developmental relation to visual acuity



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Sensorimotor Adaptation and Development of the Horopter

Two stages in the development of Binocular Vision and Eye Alignment

5. Retinal and cortical Development
6. Abnormal Visual Development
7. What next in Infant Research
8. Clinical Applications:

Assessment of Child Vision and Refractive Error

Refractive Routines in the Examination of Children

Cycloplegic Refraction

Color Vision Assessment in Children

Dispensing for the Child patient

Pediatric Contact Lens Practice

Dyslexia and Optometry Management

Electrodiagnostic Needs of Multiple Handicapped Children

Management Guidelines – Ametropia, Contant Strabismus

Management Guidelines – Amblyopia

Accommodation and Vergence anomalies

Nystagmus

Common genetic problems in Paediatric optometry

Pediatric Ocular Diseases

Ocular Trauma in Children

Myopia control

Clinical uses of prism

LOW VISION CARE AND GERIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: M.Optom/PhD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the best suitable low vision and functional assistive device for a particular condition and rehabilitation. This course gives both in-depth theoretical knowledge and clinical exposure in low vision care. The outcomes of this course are: Thorough understanding of the causes of the low vision, its functional and psychosocial consequences. Help visually impaired individuals to utilize their residual visual skills optimally and rehabilitate.

COURSE COMPETENCIES:

1. Ability to diagnose and manage patients with vision impairment
2. Ability to perform specialized diagnostics for patients with low vision with multiple disabilities
 - Rudimentary vision
 - Berkeley visual field test
 - Hand disc perimetry
3. Ability to train for eccentric viewing and steady eye techniques
4. Ability to rehabilitate patients with VI with vocational counselling and activities of daily living



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TEXT/ REFERENCE BOOKS: The lighthouse handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.

COURSE PLAN (Total: 30 hours)

1. Visual Disorders – Medical Perspective
The Epidemiology of Vision Impairment
Vision Impairment in the pediatric population
Ocular Diseases :
Age – Related Cataract,
Glaucoma
ARMD
Diabetic retinopathy
Corneal Disorders
Ocular Trauma
Sensory Neuro-ophthalmology and Vision Impairment
Refractive Disorders
2. Visual Disorders – The Functional Perspective
Low Vision and Psychophysics
Visual Functioning in Pediatric Populations with Low Vision
Perceptual correlates of Optical Disorders
Functional aspects of Neural Visual Disorders of the eye and Brain
Visual Disorders and Performance of specific Tasks requiring vision
3. Visual Disorders – The Psychosocial Perspective
Developmental perspectives – Youth
Vision Impairment and Cognition
Spatial orientation and Mobility of people with vision impairments
Social skills Issues in vision impairment
Communication and language: Issues and concerns
Developmental perspectives on Aging and vision loss
Vision and cognitive Functioning in old age
4. Interactions of Vision Impairment with other Disabilities and sensory Impairments.
Children with Multiple Impairments
Dual Vision and Hearing Impairment
Diabetes Mellitus and Vision Impairment
Vision Problems associated with Multiple Sclerosis
Vision Impairment related to Acquired Brain Injury
Vision and Dementia
Low Vision and HIV infection
5. The Environment and Vision Impairment: Towards Universal Design
Indian Disabilities act
Children's Environments
Environments of Older people
Outdoor environments
Lighting to enhance visual capabilities
Signage and way finding



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Accessible Environments through Technology

6. Vision Rehabilitation:

In Western Countries

In Asia

Personnel preparation in Vision Rehabilitation

7. Psychological and social factors in visual Adaptation and Rehabilitation

The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Children and Youth

The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Adults and Older adults

Social support and adjustment to vision Impairment across the life span

The person – Environment perspective of vision impairment

Associated Depression, Disability and rehabilitation

Methodological strategies and issues in social research on vision Impairment and rehabilitation

RESEARCH PROJECT:

Data Collection and submit the progress of the research at the end of the semester.

CLINIC: GENERAL OBJECTIVES:

The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature

CLINIC: SPECIALITY

OBJECTIVES: The objective of clinics in this semester is to be able to gets hand-on experience related to diagnosis, interpretation of the reports/ findings and management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The focus will be on the specialized subjects studies in this semester.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

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Third Semester

ADVANCED CONTACT LENSES – II

INSTRUCTOR IN CHARGE: M.OPTOM/PhD/FIACLE

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the corneal oxygen requirements and recommend the best suitable contact lens for a particular condition. Management of ocular complications with contact lenses. Understand contact lens fitting for compromised corneas and keratoconus. The student should also be able to understand the fitting philosophy of orthokeratology and myopia control.

COURSE COMPETENCIES:

1. Ability to fit specialized contact lenses
Keratoconus
Rose'Klenses
Mini scleral lenses
Hybrid lenses
Orthokeratology
Scleral lenses: Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia
2. Ability to fit custom made ocular prosthesis
3. Ability to fit pediatric contact lenses

TEXT/ REFERENCE BOOKS:

1. IACLE MODULES
2. CONTACT LENSES – STONE AND PHILIPS

COURSE PLAN: (Total: 30 hours)

1. Extended and Continuous wear Lenses
2. Scleral Contact lenses
3. Bifocal and Multifocal contact lenses
4. Orthokeratology
5. Keratoconus
6. Post keratoplasty contact lens fitting
7. Post refractive surgery contact lens fitting
8. Pediatric contact lens fitting
9. Cosmetic and prosthetic contact lens fitting
10. Contact lens for abnormal ocular conditions
11. Contact lens and Myopia control
12. Legal issues and contact lenses
13. Contact lens manufacturing
14. Modifications procedures



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LOW VISION CARE AND REHABILITATION INSTRUCTOR IN CHARGE: M.Optom/PhD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the best suitable low vision and functional assistive device for a particular condition and rehabilitation. This course gives both in-depth theoretical knowledge and clinical exposure in low vision care. The outcomes of this course are: Thorough understanding of the causes of the low vision, its functional and psychosocial consequences. Help visually impaired individuals to utilize their residual visual skills optimally and rehabilitate.

COURSE COMPETENCIES:

1. Ability to diagnose and manage patients with vision impairment
2. Ability to perform specialized diagnostics for patients with low vision with multiple disabilities
3. Ability to train for eccentric viewing and steady eye techniques
4. Ability to rehabilitate patients with VI with vocational counselling and activities of daily living

TEXT/ REFERENCE BOOKS: The lighthouse handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.

COURSE PLAN: (Total – 30 hours)

1. Habilitation of Children and Youth with vision Impairment
2. Rehabilitation of working –age Adults with Vision Impairment
3. Rehabilitation of older Adults with Vision Impairment
4. Functional consequences of vision Impairment
5. Vision evaluation of Infants
6. Educational assessment of visual function in Infants and Children
7. Functional Evaluation of the Adult
8. Functional orientation and Mobility
9. Functional Assessment of Low Vision for Activities of Daily living
10. Psychosocial assessment of adults with vision impairment
11. Assistive Devices and Technology for Low Vision
12. Assistive Devices and Technology for Blind
13. Vision and Reading - Normal Vs Low Vision
14. Clinical Implications of color vision Deficiencies

VISION THERAPY

INSTRUCTOR IN CHARGE: M.Optom/ PhD/ FCOVD

COURSE OBJECTIVES: The course is designed to help expand the student's knowledge base in all aspects of behavioural vision care. Advanced competency is expected in the following principles and procedures for each clinical condition.

COURSE COMPETENCIES:



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Principles and Procedures – The student should be able to define and explain:

1. The unique qualities, scientific, and clinical principles of each clinical condition.
2. The epidemiological and demographic characteristics of each clinical condition.
3. The characteristic history, signs and symptoms for each clinical condition.
4. How to assess each clinical condition, including specific test protocols and their interpretation.
5. The differential diagnosis for each clinical condition.
6. The specific treatment and management of each clinical condition including:
 - Prognostic indicators
 - Treatment options
 - Duration and frequency of treatment
 - Treatment philosophy and goals
 - Specific lens treatment and therapy procedures including rationale for treatment
 - Ergonomics and visual hygiene
 - Outcomes to determine successful completion of treatment
 - Frequency of follow-up care and patient instructions
 - Referral criteria (medical, neurological, educational, etc.)

TEXT/ REFERENCE BOOKS:

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press

COURSE PLAN: (Total - 30 hours)

1. Clinical Conditions
 - Strabismus and Amblyopia
 - Amblyopia
 - Anisometropic / Isometropic Refractive Amblyopia
 - Strabismic Amblyopia
 - Hysterical Amblyopia
 - Form Deprivation Amblyopia
 - Differential diagnoses in childhood visual acuity loss
 - Strabismus
 - Esotropia-
 - Infantile
 - Accommodative
 - Acquired
 - Microtropia
 - Sensory
 - Convergence Excess
 - Divergence Insufficiency
 - Non-accommodative
 - Sensory Adaptations
 - Exotropia
 - Divergence Excess
 - Convergence Insufficiency



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- Basic Exotropia
- Congenital
- Sensory
- Vertical Deviations
- Noncomitant Deviations (AV Syndrome; Duane's Retraction Syndrome; Brown's Syndrome; III, IV, VI nerve palsy, etc.)
- Differential diagnoses in strabismus
- Special clinical considerations
 - Anomalous Correspondence
 - Eccentric Fixation
 - Suppression
 - Motor Ranges
 - Stereopsis
 - Horror fusionalis/intractable diplopia
- Perception and Information Processing
 - Neurological / Psychological
 - Ambient / focal systems.
 - Visual perceptual midline
 - Parvo cellular / Magno cellular function
 - Perceptual Style (central, peripheral)
 - Impact of colored filters
 - Attention
- Intersensory and Sensorimotor Integration
 - Visual-auditory
 - Visual-vestibular
 - Visual-oral
 - Visual-motor
 - Visual-tactual
- Performance indicators
 - Laterality and directionality
 - Visual requirements for academic success
 - Bilaterality
 - Gross and fine motor ability
 - Form perception/visual analysis
 - Spatial awareness
 - Visualization
 - Visual memory
 - Visual sequential memory
 - Form constancy
 - Visual speed and visual span
 - Visual sequencing
- Refractive conditions and visual skills
 - Refractive Conditions
 - Developmental influence on refraction & emmetropization
 - Aniseikonia
 - Myopia
 - Astigmatism
 - Hyperopia
- Ocular Motor Function
 - Eye movements and reading
 - Pursuit dysfunctions
 - Nystagmus
 - Saccadic Dysfunctions



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- Accommodation
 - Role in myopia development
 - Role in computer-related asthenopia
 - Fusion in Non-Strabismic Conditions
 - Fixation disparity
 - Motor fusion
 - Sensory fusion
 - Special clinical conditions
 - Acquired brain injury (traumatic brain injury {TBI} and stroke)
 - Developmental disabilities (Down Syndrome, Developmental delay, etc.)
 - Visually induced balance disorders
 - Motor disabilities (Cerebral Palsy, ataxia, etc.)
 - Behavioral disorders
 - Autism spectrum disorders
 - ADD / ADHD
 - Dyslexia and specific reading disabilities
 - Learning Disabilities
 - Computer Vision Syndrome
2. Vision Therapy Concepts to Consider Peripheral awareness:
- focal / ambient roles
 - Significant findings which are good or poor prognostic indicators of visiontherapy and lens application
 - Development, rehabilitation, prevention, enhancement
 - Behavioral lens application
 - Yoked prism rationale for treatment and application
 - The relationship between the visual and vestibular systems
 - SILO/SOLI
 - Visual stress and its impact on the visual system
 - Role of posture in vision development, comfort and performance
 - Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool.
 - Relationship of speech-auditory to vision
 - How television, reading, video gaming might restrict movement, computerwork, nutrition, etc., impact vision?
 - Perceptual Style, e.g., spatial/temporal, central/peripheral



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RESEARCH PROJECT:

Data Collection, Literature search , Presentation of the progress of the project to the guide.

CLINIC: GENERAL

OBJECTIVES: The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature

CLINIC: SPECIALITY

OBJECTIVES: The objective of clinics in this semester is to be able to gets hand-on experience related to diagnosis, interpretation of the reports/findings and management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The focus will be on the specialized subjects studies in this semester.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature

Fourth Semester

RESEARCH PROJECT:

Literature search, Data analysis, Interim Analysis, Thesis write-up, Presentation of the research work in front of the experts, and manuscript write –up for journal (optional)

CLINIC: GENERAL OPTOMETRY

OCULAR DISEASES AND DIAGNOSTICS - I

COURSE COMPETENCIES:

1. Ability to perform clinical decision making for Ocular abnormalities
2. Ability to perform and interpret corneal diagnostics including
Topography/Pentacam/Orbscan
Specular microscopy
Pachymetry
Abberometry



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3. Ability to perform pre and post Lasik evaluation
4. Ability to interpret glaucoma diagnostic reports
OCT
HRT
GDx
Gonioscopy
ONH evaluation
5. Ability to perform anterior segment photography and ophthalmic imaging
6. Ability to manage and co-manage therapeutics for anterior segment

OCULAR DISEASES AND DIAGNOSTICS - II

COURSE COMPETENCIES:

1. Ability to perform electro diagnostic procedures and interpret electro diagnostic reports
ERG
EOG
VEP
2. Ability to perform stereoscopic fundus photography
3. Ability to use Ocular photography as a tool for evidence based clinical decision making and progression analysis
4. Ability to perform posterior segment photography
5. Ability to manage and co-manage diseases and disorders of posterior segment

LOW VISION CARE

COURSE COMPETENCIES:

1. Ability to diagnose and manage patients with vision impairment
2. Ability to perform specialized diagnostics
Rudimentary vision
Berkeley visual field test
Hand disc perimetry
3. Ability to train for eccentric viewing and steady eye techniques
4. Ability to rehabilitate patients with VI with vocational counselling and activities of daily living

PEDIATRIC OPTOMETRY AND BINOCULAR VISION:

COURSE COMPETENCIES:

1. Ability to diagnose and manage and co-manage binocular vision anomalies
2. Ability to co-manage visual perceptual anomalies
3. Ability to manage diplopia, suppression and ARC
4. Ability to manage amblyopia



ADVANCED CONTACT LENSES – I

COURSE COMPETENCIES:

1. Ability to understand corneal physiology and oxygen needs
2. Ability to diagnose and manage complications due to contact lenses
3. Ability to fit specialized contact lenses

Keratoconus
Rose'Klenses
Mini scleral lenses

ADVANCED CONTACT LENSES – II

COURSE COMPETENCIES:

1. Ability to fit specialized contact lenses
Keratoconus
Rose'Klenses
Mini scleral lenses
Hybrid lenses
Orthokeratology
Scleral lenses: Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia
2. Ability to fit custom made ocular prosthesis
3. Ability to fit pediatric contact lenses

VISION THERAPY

COURSE COMPETENCIES:

1. Principles and Procedures – The student should be able to define and explain:
The unique qualities, scientific, and clinical principles of each clinical condition.
The epidemiological and demographic characteristics of each clinical condition.
The characteristic history, signs and symptoms for each clinical condition.
How to assess each clinical condition, including specific test protocols and their interpretation.
The differential diagnosis for each clinical condition.
The specific treatment and management of each clinical condition including:
Prognostic indicators
Treatment options
Duration and frequency of treatment
Treatment philosophy and goals
Specific lens treatment and therapy procedures including rationale fortreatment
Ergonomics and visual hygiene
Outcomes to determine successful completion of treatment
Frequency of follow-up care and patient instructions
Referral criteria (medical, neurological, educational, etc.)



Skills based outcomes and monitorable indicators for Optometrist

1. PATIENT HISTORY

Communicates with the patient

Modes and methods of communication are employed which take into account the physical, emotional, intellectual and cultural background of the patient.

A structured, efficient, rational and comfortable exchange of information between the optometrist and the patient takes place.

Makes general observations of patient

Obtains the case history

Obtains and interprets patient information from other professionals

2. PATIENT EXAMINATION

Formulates

An examination plan based on the patient history is designed to obtain the information necessary for diagnosis and management.

Tests and procedures appropriate to the patient's condition and abilities are selected.

Implements examination plan

Tests and procedures which will efficiently provide the information required for diagnosis are performed.

The examination plan and procedures are progressively modified on the basis of findings.

Assesses the ocular adnexae and the eye

The structure and health of the ocular adnexae and their ability to function are assessed.

The structure and health of the anterior segment and its ability to function are assessed.

The structure and health of the ocular media and their ability to function are assessed.

The structure and health of the posterior segment and its ability to function are assessed.

The nature of the disease state is determined.

Microbiological tests are selected and ordered

Assesses central and peripheral sensory visual function and the integrity of the visual pathways

Vision and visual acuity are measured.

Visual fields are measured.

Colour vision is assessed.

Pupil function is assessed.

Assesses refractive status

Assesses oculomotor and binocular function.

Eye alignment and the state of fixation are assessed.

The quality and range of the patient's eye movements are determined.

The status of sensory fusion is determined.

The adaptability of the vergence system is determined.

Placement and adaptability of accommodation are assessed.

Assesses visual information processing



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Visual perceptual abilities are assessed.

Visual-motor integration is assessed.

Assesses the significance of signs and symptoms found incidental to the ocularexamination in relation to the patient's eye and/or general health.

Pertinent non-ocular signs and symptoms found incidentally during the ocular examination are identified and considered.

Ensures that significant non-ocular signs and symptoms are investigated.

3. DIAGNOSIS

Interprets and analyses findings to establish a diagnosis or diagnoses.

Accuracy and validity of test results and information from the case historyand other sources are critically appraised.

Test results and other information are analysed, interpreted and integrated toestablish the diagnosis or diagnoses.

4. PATIENT MANAGEMENT

Designs a management plan for each patient and implements the plan agreed to withthe patient.

The diagnosis is presented and explained to the patient.

Consideration is given to the relative importance or urgency of thepresenting problems and examination findings.

Management options to address the patient's needs are explained.

A course of management is chosen with the patient, following counselling and explanation of the likely course of the condition, case management and prognosis.

The informed consent of the patient is obtained for the initiation and continuation of treatment.

Patients requiring ongoing care and review are recalled as their clinical condition indicates, and management is modified as indicated.

Prescribes spectacles

The suitability of spectacles as a form of correction for the patient is assessed.

The patient's refraction, visual requirements and other findings are applied to determine the spectacle prescription.

Prescribes contact lenses

The suitability of contact lenses as a form of correction for the patient isassessed.

The patient's refraction, visual requirements and other findings are appliedto determine the contact lens prescription.

Therapeutic and cosmetic contact lenses are recommended and prescribed.

Contact lenses are correctly ordered and on receipt, parameters are verifiedbefore the lenses are supplied to the patient.

Contact lenses are checked on the eye for physical fitting and visualperformance.

The patient is instructed in matters relating to ocular health and vision incontact lens wear, contact lens care and maintenance.

Contact lens performance, ocular health and patient adherence to wearingand maintenance regimen is monitored.

Prescribes low vision devices.



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A range of low vision devices is demonstrated.

Low vision devices suited to the patient's visual requirements and functional needs are prescribed.

The patient is instructed in the use of the low vision device.

The success of the low vision device is evaluated and monitored and additional or alternative devices are prescribed.

The patient is informed of and, if necessary, referred to other rehabilitative services.

Prescribes pharmacological treatment regimens

Selects appropriate pharmacological agents for the treatment of the patient's condition.

- Microbiological factors are considered in the choice of therapeutic agent(s)
- Pharmacological factors are considered in the choice of therapeutic agent(s)
- Systemic factors are considered in the choice of therapeutic agent(s)
- Ocular factors are considered in the choice of therapeutic agent(s)
- Available delivery systems are considered in the choice of therapeutic agent(s)
- Drug substitution factors are considered in the choice of therapeutic agent(s)

Prescribes therapeutic drugs.

Monitors and modifies treatment regimen.

Instructs/counsels patient on the correct use of the prescribed drugs.

Patients are instructed about precautionary procedures and non-therapeutic management.

Dispenses optical prescriptions accurately.

The prescription is interpreted and responsibility for dispensing is accepted.

The patient is assisted in selecting an appliance.

Lenses are ordered and fitted to spectacle frames in accordance with accepted standards.

The appliance is verified against the prescription prior to delivery.

The appliance is adjusted and delivered and the patient is instructed in the proper use and maintenance of the appliance and of any adaptation effects which may be expected.

Manages patients requiring vision therapy.

Treats patients diagnosed with accommodative, vergence, strabismic and amblyopic conditions.

The patient is instructed in the use and maintenance of vision training equipment.

Goals of the vision therapy program and criteria for discharge are set.

Progress of the vision therapy program is monitored.

Treats ocular disease and injury.

Non-pharmacological treatment or intervention procedures are performed.

Pharmacological and/or other regimens are instituted and therapeutic devices are introduced to treat eye conditions.

The patient is instructed in the use, administration, storage and disposal of pharmaceutical agents.



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The effect of treatment is monitored and changes in management are recommended.
Refers the patient.

The need for referral to other professionals for assessment and/or treatment is recognised and discussed with the patient.

A suitable professional is recommended to the patient.

Timely referral, with supporting documentation, is made to other professionals.
Patients can be jointly managed with other health care practitioners.

Co-operates with ophthalmologist in the provision of pre- and post-operative management of patients.

Provides pre-operative assessment and advice.

Provides post-surgical follow-up assessment and monitoring of patients according to the surgeon's requirements and the procedure undertaken.

Provides emergency management for observed post-surgical complication.

Arranges appropriate referral for further post-operative treatment assessment of complications.

Provides advice on vision in the workplace.

Visual screenings for occupational or other purposes are provided.

Advice is provided on eye protection, visual standards and visual ergonomics in the workplace.

Individuals are counselled on the suitability of their vision for certain occupations.

Certification of an individual's visual suitability for designated occupations or tasks is provided.

5. RECORDING OF CLINICAL DATA

Ensures that data is organised in a legible, secure, accessible, permanent and unambiguous manner.

All relevant information pertaining to the patient is recorded in a format which is understandable and useable by the optometrist and his/her colleagues.

Patient records are kept in a readily retrievable format and are physically secure.

Maintains confidentiality of patient records.

Understands the need to ensure that access to records is limited to authorised personnel.

Information from patient records and/or obtained from patients is released only with the consent of the patient.

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