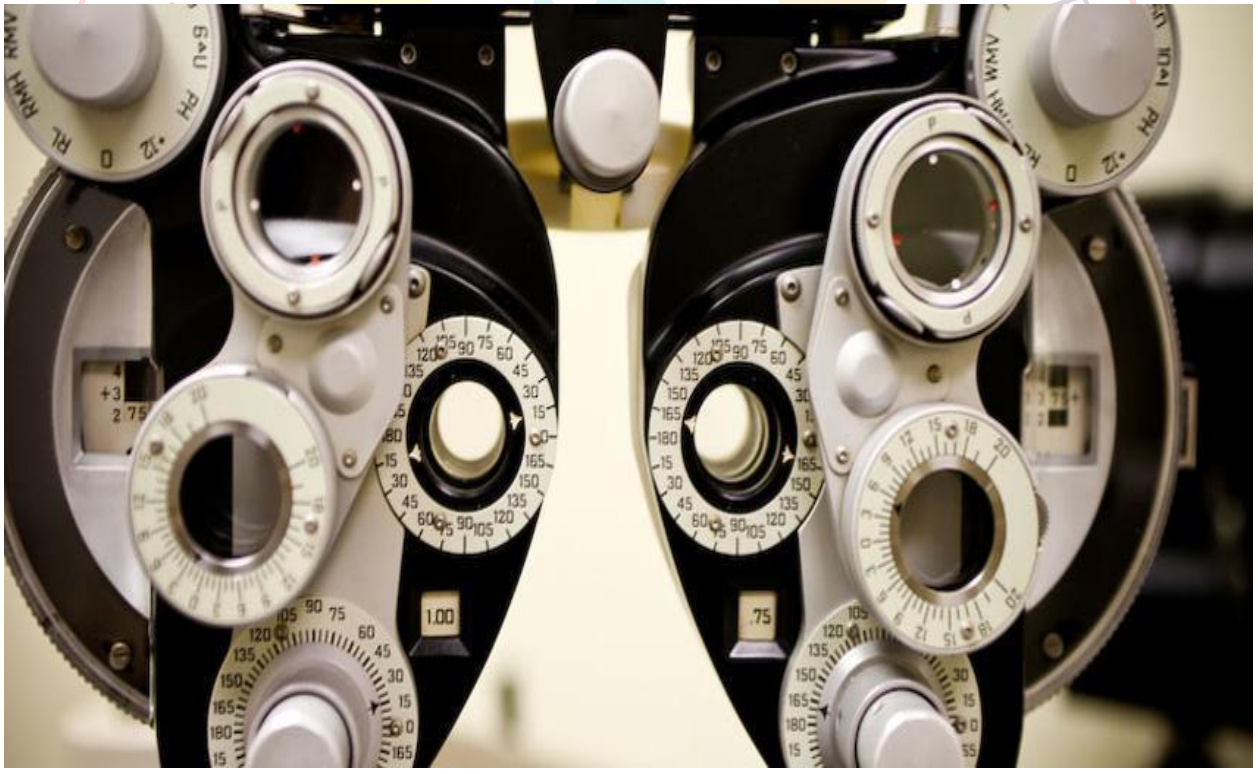
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National Commission for Allied and Healthcare Professions

COMPETENCY BASED CURRICULUM

for

"OPTOMETRY"



As per the NCAHP Act -2021

APPROVED SYLLABUS

2025

Ministry of Health & Family Welfare

"Curriculum of Optometry (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare)."

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List of Abbreviations

AHP	Allied and Healthcare Professional
AED	Automated External Defibrillator
ANSI	American National Standard Institute
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BOptom	Bachelor of Optometry
BLS	Basic Life Support
BMW	Bio Medical Waste
BSc	Bachelor of Science
BSV	Binocular Single Vision
BVM	Bag-Valve-Masks
C	Credit
CR	Challenge rating
CE	Continuing Education
CATS	Credit Accumulation and Transfer System
CbD	Case-based Discussion
CBSE	Central Board of Secondary Education
CEX	Mini Case Evaluation Exercise
CHC	Community Health Centre
CL	Contact Lenses
CLC	Circle of Least Confusion
CMOC	Common Minimum Optometry Curriculum
COPD	Chronic Obstructive Pulmonary Disease
CPR	Cardiopulmonary Resuscitation
CPU	Central Processing Unit
DH	District Hospital
DOPs	Direct Observation of Procedures

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EBV	Epstein-Barr Virus
ECG	Electro Cardio Gram
ECHO	Echocardiography
ECTS	European Credit Transfer System
EEG	Electroencephalogram
EMG	Electromyography
EOG	Electrooculogram
ERG	Electroretinogram
ESI	Employees' State Insurance
FAQ	Frequently Asked Questions
FDA	Food and Drug Administration
GSE	Gullstrand's Schematic Eye
HBV	Hepatitis B Virus
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
HSSC	Healthcare Sector Skill Council
HVID	Horizontal Visible Iris Diameter
IA	Internal Assessment
ICAHP	Interim Commission for Allied & Healthcare Professions
ICT	Information & Communication Technology
ICU	Intensive Care Unit
IELOCS	Indian Entry Level Optometry Competency Skill Standard
ILO	International Labour Organization
IPD	Inter-pupillary distance
KPI	Key Performance Indicator
JCC	Jackson Cross-Cylinder
JCI	Joint Commission International
L	Lecture
LAN	Local Area Network

LPS	Levator Palpebrae Superioris
M Optom	Master of Optometry
MLC	Medico Legal Case
MoHFW	Ministry of Health and Family Welfare
MS	Microsoft
MSc	Master of Science
MSR	Minimum Standard Requirement
MTF	Modulation Transfer Function
NAAC	National Assessment and Accreditation Council
NABH	National Accreditation Board for Hospitals & Healthcare Providers
NCRC	National Curricula Review Committee
NCAHP	National Commission for Allied & Healthcare Professions
NIAHS	National Initiative for Allied and Healthcare Sciences
NITBUT	Non-Invasive Tear Break-Up Time
NPCB	National Programme for Control of Blindness
OSCE	Objective Structured Clinical Examination
OSLER	Objective Structured Long Examination Record
OSPE	Objective Structured Practical Examination
P	Practical
PBCT	Prism Bar Cover Test
PFT	Pulmonary Function Test
PHC	Primary Health Centre
PhD	Doctor of Philosophy
PPE	Personal protective equipment
RAPD	Relative Afferent Pupillary Defect
RGP	Rigid Gas Permeable
ROPLAS	Regurgitation On Pressure over Lacrimal Sac
SCA	Sudden Cardiac Arrest

SCL	Soft Contact Lenses
SDH	Sub District Hospital
SMP	Simultaneous macular perception
SN	Staff Nurse
STD	Sexually Transmitted Diseases
T	Theory
TBUT	Tear breakup time
TSU	Technical Support Unit
UE	University Examination
UHC	Universal Health Coverage
UV	Ultra Violet
VEP	Visual Evoked Potential
WAN	Wide Area Network
WCA	Workmen's Compensation Act
WHO	World Health Organization
WWW	World Wide Web

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Chapter 1

Introduction to the Handbook

Chapter 1: Introduction to the Handbook

The report 'From Paramedics to Allied Health Professionals: Landscaping the Journey and Way Forward' that was published in 2012, marked the variance in education and training practices for the allied and healthcare courses offered by institutions across the country. This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathways of allied and healthcare professionals, with a structured curriculum based on skills and competencies. Thus, this handbook has been designed to familiarize universities, colleges, healthcare providers as well as educators offering allied and healthcare courses with these national standards.
Individually, created for different professional groups of allied and healthcare, this handbook aims to reduce the variation in education by having a standardized curriculum, career pathways, nomenclature and other details for each profession. The change from a purely didactic approach will create better skilled professionals and improve the quality of overall patient care. Based on the recommendations of the NCAHP Act this handbook can also guide the thousands of young adults who choose healthcare as a profession on the appropriate course of action to enable them to be skilled allied and healthcare professionals of the future

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

'Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'

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The National Commission for Allied and Healthcare Professions Act, 2021 (The NCAHP Act 2021) was passed by Rajya Sabha on March 16, 2021, and by Lok Sabha on March 24, 2021. The Government notified it in the Gazette of India on March 28, 2021, after it received the assent of the President. The Act provides for "regulation and maintenance of standards of education and services by allied and healthcare professionals, assessment of institutions, maintenance of a Central Register and State Register" of professionals.

NCAHP Act is to provide for regulation and maintenance of standards of education and services by allied and healthcare professionals, assessment of institutions, maintenance of a Central Register and State Register and creation of a system to improve access, research and development and adoption of latest scientific advancement and for matters connected therewith or incidental thereto.

Scope and need for allied and healthcare professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.[1] Professionals that can competently handle sophisticated machinery, advanced protocols and interpret reports and analyze results are now in high demand globally. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to diagnosis and successful management

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, the Indian healthcare system still revolves around the doctor-centric approach leading to long waiting lists and delayed treatments.. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to reduce chronic workforce shortages and improve patient access in a range of locations and special care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.[2] Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems

and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, Allied health professionals are capable of providing a broad range of diagnostic, technical, therapeutic and direct health services to improve the health and wellbeing of the consumers they support. The breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society
- To provide management and rehabilitative therapies to patients/individuals where non-surgical treatments are indicated or advocated.

Learning goals and objectives for allied and healthcare professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

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1. Clinical Care

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services. Program objectives should enable the students to:

- Apply the principles of basic science and evidence-based practice
- Use relevant investigations as needed
- Identify the indications for basic procedures and perform them in an appropriate manner.
- Provide care to patients – efficiently and in a cost-effective way – in a range of settings, and maintain foremost the interests of individual patients.
- Identify the influence of biological, psychosocial, economic, and spiritual factors on patients' well-being and act in an appropriate manner.
- Incorporate strategies for health promotion and disease prevention with their patients.

2. Communication

The student will learn how to communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately. Communication is a fundamental requirement in the provision of health care services. Program objectives should enable the students to:

- Provide sufficient information to ensure that the patient/client can participate as actively as possible and respond appropriately to the information
- Clearly discuss the diagnosis and options with the patient, and negotiate appropriate treatment plans in a sensitive manner that is in the patient's and society's best interests
- Explain the proposed healthcare service – its nature, purpose, possible positive and adverse consequences, its limitations, and reasonable alternatives wherever they exist
- Use effective communication skills to gather data and share information including attentive listening, open-ended inquiry, empathy and clarification to ensure understanding
- Appropriately communicate with, and provide relevant information to, other stakeholders including members of the healthcare team
- Use communication effectively and flexibly in a manner that is appropriate for the reader or listener
- Explore and consider the influence that the patient's ideas, beliefs and expectations have during interactions with them, along with varying factors such as age, ethnicity, culture and socioeconomic background

- Develop efficient techniques for all forms of written and verbal communication including accurate and timely record keeping
- Assess their own communication skills, develop self-awareness and be able to improve their relationships with others
- Possess skills to counsel for lifestyle changes and advocate health promotion.

3. Membership of a multidisciplinary health team

The student will put a high value on effective communication within the team, including transparency about aims, decisions, uncertainty and mistakes. Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively to accomplish shared goals within and across settings to achieve coordinated, high quality care. Program objectives will aim at making the students being able to:

- Recognize, clearly articulate, understand and support shared goals in the team that reflect patient and family priorities
- Possess distinct roles within the team; to have clear expectations for each member's functions, responsibilities, and accountabilities, which in turn optimizes the team's efficiency and makes it possible for them to use division of labor advantageously, and accomplish more than the sum of its parts
- Develop mutual trust within the team to create strong norms of reciprocity and greater opportunities for shared achievement
- Communicate effectively so that the team prioritizes and continuously refines its communication channels creating an environment of general and specific understanding
- Recognize measurable processes and outcomes, so that the individual and team can agree on and implement reliable and timely feedback on successes and failures in both the team's functioning and the achievement of their goals. These can then be used to track and improve performance immediately and over time.

4. Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as physicians. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice

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- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

5. Commitment to professional excellence

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare. Program objectives will aim at making the students being able to:

- Demonstrate distinctive, meritorious and high quality practice that leads to excellence and that depicts commitment to competence, standards, ethical principles and values, within the legal boundaries of practice
- Demonstrate the quality of being answerable for all actions and omissions to all, including service users, peers, employers, standard-setting/regulatory bodies or oneself
- Demonstrate humanity in the course of everyday practice by virtue of having respect (and dignity), compassion, empathy, honour and integrity
- Ensure that self-interest does not influence actions or omissions, and demonstrate regards for service-users and colleagues

6. Leadership and mentorship

The student must take on a leadership role where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services. Program objectives should enable the students to:

- Act as agents of change and be leaders in quality improvement and service development, so that they contribute and enhance people's wellbeing and their healthcare experience
- Systematically evaluate care; ensure the use of these findings to help improve people's experience and care outcomes, and to shape clinical treatment protocols and services
- Identify priorities and effectively manage time and resources to ensure the maintenance or enhancement of the quality of care

- Recognize and be self-aware of the effect their own values, principles and assumptions may have on their practice. They must take charge of their own personal and professional development and should learn from experience (through supervision, feedback, reflection and evaluation)

- Facilitate themselves and others in the development of their competence, by using a range of professional and personal development skills

- Work independently and in teams. They must be able to take a leadership role to coordinate, delegate and supervise care safely, manage risk and remain accountable for the care given; actively involve and respect others' contributions to integrated person-centered care; yet work in an effective manner across professional and agency boundaries. They must know when and how to communicate with patients and refer them to other professionals and agencies, to respect the choices of service users and others, to promote shared decision-making, to deliver positive outcomes, and to coordinate smooth and effective transition within and between services and agencies.

7. Social Accountability and Responsibility

The students will recognize that allied and healthcare professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability. They have a mandate to serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns. Program objectives should enable the students to:

- Demonstrate knowledge of the determinants of health at local, regional and national levels and respond to the population needs

- Establish and promote innovative practice patterns by providing evidence-based care and testing new models of practice that will translate the results of research into practice, and thus meet individual and community needs in a more effective manner

- Develop a shared vision of an evolving and sustainable health care system for the future by working in collaboration with and reinforcing partnerships with other stakeholders, including academic health centres, governments, communities and other relevant professional and non-professional organizations

- Advocate for the services and resources needed for optimal patient care

8. Scientific attitude and Scholarship

The student will utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives. Program objectives should enable the students to:

- Engage in ongoing self-assessment and structure their continuing professional education to address the specific needs of the population
- Practice evidence-based by applying principles of scientific methods
- Take responsibility for their educational experiences
- Acquire basic skills such as presentation skills, giving feedback, patient education and the design and dissemination of research knowledge; for their application to teaching encounters

9. Lifelong learning

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to:

- Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills
- Apply newly gained knowledge or skills to patient care
- Enhance their personal and professional growth and learning by constant introspection and utilizing experiences
- Search (including through electronic means), and critically evaluate medical literature to enable its application to patient care
- Develop a research question and be familiar with basic, clinical and translational research in its application to patient care
- Identify and select an appropriate, professionally rewarding and personally fulfilling career pathway

Introduction of salient elements in Allied and Healthcare education

Competency-based curriculum

A significant skill gap has been observed in the professionals offering healthcare services irrespective of the hierarchy and level of responsibility in the healthcare settings. The large variation in the quality of services is due to the diverse methodologies opted for healthcare education and the difference in expectations from a graduate after completion of a course and at work. What one is expected 'to perform' at work is assumed to be learned during the course, however, the course design focuses on what one is expected 'to know'. The competency-based curriculum thus connects the dots between the 'know what' and 'do how'.

The efficiency and effectiveness of any educational programme largely depends on the curriculum design that is being followed. With emerging medical and scientific knowledge, educators have realized that learning is no more limited to memorizing specific lists of facts and data; in fact, by the time the professional aims to practice in the healthcare setting, the acquired knowledge may stand outdated. Thus, competency-based education is the answer; a curricular concept designed to provide the skills that professionals need. A competency-based program is a mix of skills and competencies based on individual or population needs (such as clinical knowledge, patient care, or communications approaches), which is then developed to teach relevant content across a range of courses and settings. While the traditional system of education focuses on objectives, content, teacher-centric approach and summative evaluation; competency-based education has a focus on competencies, outcomes, performance and accomplishments. In such a case, teaching activities are learner-centered, and evaluation is continuous and formative in structure. The competency-based credentials depend on the demonstration of a defined set of competencies which enables a professional to achieve targeted goals. Competency frameworks comprise of a clearly articulated statement of a person's abilities on the completion of the credential, which allows students, employers, and other stakeholders to set their expectations appropriately.

Considering the need of the present and future healthcare delivery system, the curriculum design depicted in this handbook thus will be based on skills and competencies.

Credit hours

Globally, a need exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmes', 'joint degrees' and 'study abroad' programmes.

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

More importantly the allied and health care professions are now defined for its qualification of the degree in terms of completion or coverage of academic hours. The definition of the allied health and health care professional as per the NCAHP Act is provided below:

"**Allied Health Professional**" includes an associate, technician or technologist who is trained to perform any technical and practical task to support diagnosis and treatment of illness, disease, injury or impairment, and to support implementation of any healthcare treatment and referral plan recommended by a medical, nursing or any other healthcare professional, and who has obtained any qualification of diploma or degree under this Act, the duration of which **shall not be less than two thousand hours** spread over a period of two years to four years divided into specific semesters;

"**Healthcare Professional**" includes a scientist, therapist or other professional who studies, advises, researches, supervises or provides preventive, curative, rehabilitative, therapeutic or promotional health services and who has obtained any qualification of degree under this Act, the duration of which **shall not be less than three thousand six hundred hours** spread over a period of three years to six years divided into specific semesters.

Integrated structure of the curriculum

Vertical integration, in its truest sense, is the interweaving of teaching clinical skills and knowledge into the basic science years and, reinforcing and continuing to teach the applications of basic science concepts during the clinical years. (Many efforts called 'vertical integration' include only the first half of the process).

Horizontal integration is the identification of concepts or skills, especially those that are clinically relevant, that cut across (for example, the basic sciences), and then putting these to use as an integrated focus for presentations, clinical examples, and course materials. e.g. Integration of some of the basic science courses around organ systems, e.g., human anatomy, physiology, pathology; or incorporating ethics, legal issues, finance, political issues, humanities, culture and computer skills into different aspects of a course like the Clinical Continuum.

The aim of an integrated curriculum is to lead students to a level of scientific fluency that is beyond mere fact and concept acquisition, by the use of a common language of medical science, with which they can begin to think creatively about medical problems.

This new curriculum has been structured in a way such that it facilitates horizontal and vertical integration between disciplines; and bridges the gaps between both theory & practice, and between hospital-based practice and community practice. The amount of time devoted to basic and laboratory sciences (integrated with their clinical relevance) would be the maximum in the first year, progressively decreasing in the second through the final years of the training, making clinical exposure and learning more dominant.[3] However it may differ from course to course depending on the professional group.

Introduction of foundation course in the curriculum

The foundation course for allied and healthcare professions is an immersive programme designed to impart the required knowledge, skills and confidence for seamless transition to the second semester of a professional allied and healthcare course. Post admission, the foundation course is designed for a period of 6 months to prepare a student to study the respective allied and healthcare course effectively and to understand the basics of healthcare system. This aims to orient the student to national health systems and the basics of public health, medical ethics, medical terminologies, communication skills, basic life support, computer learning, infection prevention and control, environmental issues and disaster management, as well as orientation to the community with focus on issues such as gender sensitivity, disability, human rights, civil rights etc.

Though the flexibility to the course designers have been provided in terms of – modifying the required numbers of hours for each foundation subject and appropriate placement of the subject across various semesters.

Learning methodologies

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic clinical skills and professionalism; and will incorporate clinical training from the first year itself. It is recommended that the primary care level should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There should also be an emphasis on the introduction of case scenarios for classroom discussion/case-based learning.

Healthcare education and training is the backbone of an efficient healthcare system and India's education infrastructure is yet to gain from the ongoing international technological revolution. The report '*From Paramedics to Allied Health: Landscaping the Journey and way ahead'*, indicates that teaching and learning of clinical skills occur at the patient's bedside or other clinical areas such as laboratories, augmented by didactic teaching in classrooms and lecture theatres. In addition to keeping up with the pace of technological advancement, there has been a paradigm shift to outcome-based education with the adoption of effective assessment patterns. However, the demand for demonstration of competence in institutions where it is currently limited needs to be promoted. The report also mentions some of the allied and healthcare schools in India that have instituted clinical skill centres, laboratories and high-fidelity simulation laboratories to enhance the practice and training for allied and healthcare students and professionals. The report reiterates the fact that simulation is the replication of part or all of a clinical encounter through the use of mannequins, computer-assisted resources and simulated patients. The use of simulators addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills assessment methods among others. The table mentioned below lists various modes of teaching and learning opportunities that harness advanced tools and technologies.

Table 1 Clinical learning opportunities imparted through the use of advanced techniques[1]

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios
	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills
	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	As specific to Optometry related course

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Assessment methods

Traditional assessment of students consists of the yearly system of assessments. In most institutions, assessments consist of internal and external assessments, and a theory examination at the end of the year or semester. This basically assesses knowledge instead of assessing skills or competencies. In competency-based training, the evaluation of the students is based on the performance of the skills as per their competencies. Hence, all the three attributes – knowledge, skills, and attitudes – are assessed as required for the particular competency. Several new methods and tools are now readily accessible, the use of which requires special training. Some of these are given below:

- Objective Structured Clinical Examination(OSCE), Objective Structured Practical Examination (OSPE), Objective Structured Long Examination Record(OSLER)
- Mini Case Evaluation Exercise(CEX)
- Case-based discussion(CBD)
- Direct observation of procedures(DOPs)
- Portfolio
- Multi-source feedback
- Patient satisfaction questionnaire

An objective structured clinical examination (OSCE) is used these days in a number of allied and healthcare courses, e.g. Optometry, Physiotherapy, and Radiography. It tests the performance and competence in communication, clinical examination, and medical procedures/prescriptions. In physiotherapy, orthotics, and occupational therapy, it tests exercise prescription, joint mobilization/manipulation techniques; and in radiography it tests radiographic positioning, radiographic image evaluation, and interpretation of results. The basic essential elements consist of functional analysis of the occupational roles, translation of these roles ("competencies") into outcomes, and assessment of trainees' progress in these outcomes on the basis of demonstrated performance. Progress is defined solely by the competencies achieved and not the underlying processes or time served in formal educational settings. Most methods use predetermined, agreed assessment criteria (such as observation check-lists or rating scales for scoring) to emphasize on frequent assessment of learning outcomes. Hence, it is imperative for teachers to be aware of these developments and they should suitably adopt them in the allied and healthcare education system.

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Chapter 2
Methodology of Curriculum Development

Chapter 2: Methodology of curriculum development

With the release of the report 'From Paramedics to Allied Health: Landscaping the journey and the way ahead', the Ministry of Health and Family Welfare prioritized the key recommendations and concerns raised by various allied and healthcare professionals groups and experts as indicated in the report. One of the major recommendations in the report was the need for standardization of curriculum and pedagogic requirements for the major allied and healthcare professional courses.

Following the NCAHP Act and aligning with the provisions for the regulation and maintenance of standards of education and services by allied and healthcare professionals, the need for uniform standard curriculum and up gradation of the curriculum according to the current needs of the country is sought. Considering the standards of the professions from across countries and referring to the changes in the curricula across international and national reputed universities and institutions, this curriculum including a comprehensive and globally acceptable set of educational standards based on a skills and competencies approach was arrived at. Opinions of key members of the profession were also sought.

Steps undertaken in the curricula review process –

The common minimum optometry curriculum (CMOC) was first released in the year 2010 and the same was approved and uploaded in the Ministry of Health and family Welfare, Government of India in the year 2016 and available in the public domain for the institutions and universities to follow.

A meeting was convened on 21.03.2023 with the Interim Commission subject experts followed by a series of meetings with experts from across the country from 22.03.2023 to 25.03.2023 to revise the existing model curricula of Optometry. Several issues were discussed pertaining to the courses running in the country including nomenclature issues, lack of practical exposure, mushrooming of institutions, and lack of educational standards among several others.

All the experts deliberated on the issues and a consensus was attained on the following thematic areas.

1. **Minimum curricula guidelines** are to be designedfor Optometry profession.

- Curricula should be patient-centric andfuturistic.
    - Must include the latest advancement intechnology.
    - Should be aligned with global standards andallow global mobility

2. **All programs should be delivered in full-time mode** and no institution should deliver any part-time or distance program in the healthcaresciences.

3. **Curricula must consider:**

- Definition of the profession
- Entry criteria to the profession
- Entry qualification to the profession- Bachelor level programs desired in the profession other than entry qualification
- Nomenclature of the qualifications
- Duration of each level of the program with the duration of the internship.
- Must-have competencies at the end of each level and competencies must drive the curriculum content.
- Program evaluation framework/ assessment atthe end of each program
- Number of desired faculty (with hierarchy/ designation) and defined minimum qualifications for each level of the program
- Batch size and student and faculty ratios
- Details of reference books, journals and desirable and essential equipment must also be considered.

4. A pre-determined credit-based system is to be followed for Optometry that ensure a basic minimum competency in essentialsubjects:

- Credits and the number of hours must beallocated to each subject.
- While lateral entry and bridge programs can bedevised for existing professionals for entry, multiple exits may not be implemented.

5. Common entrance mechanism to be consideredfor Optometry programs:

- **Universities can consider a common entrance exam** along with **50% in 10+2 science** (Biology and/or Mathematics as per the requirement of the professions) or equivalent **or University/State entrance examination** for admissions in the allied and healthcare programs.

- **Remedial Biology/ Mathematics is to be considered if knowledge is desired in the domain** and the entry criteria allow students without qualifying the same subjects in 10+2 or equivalent.

6. **The medium of teaching should be 'English'**

- Students from other boards without English as a compulsory subject may be encouraged to pick English as an elective from available resources on Swayam and similar platforms.
- The completion of the course will not lead to any university course credit (non-university course).

7. **Competency framework** (including performance criteria and related knowledge, skill and behaviors)to be included in each level of the program.

- **Competencies should be measurable andaligned with assessments.**
- **Foundations Courses –** may be spread across the length of the program and weightage to the content/ number of hours/ credits may vary as per the requirement of individual professions.
- Soft skills and communication to be focused.

8. All programs must have a mandatory internship

- The length of the internship will be determined by the extent of competencies to be attained by the candidate after the program.
- Clinical programs can also mandate **rotatory internships** to increase the level of clinical exposure to the students
- Teaching institutions should be accountable for ensuring the internship of the students in the affiliated hospital, as it is part of the academic program**.**
- Standalone institutions must have a MoU with either a medical college or hospital or healthcare facility as per the guidelines (desired number of OPD etc.) defined in the curriculum to ensure practical exposure to the students.
- MoU to also define the clinical supervision of the students -institutional staff or clinical preceptors can be considered.
- Stipend of reasonable amount must be paid for internship students.
- Internships cannot be reflected as work experience as those are part of the academic program.
- Studentship or observership must also be in built into the curriculum.
- Simulation and skill labs can be used for practicing skills specific to the program if available in the initial years of observership/ studentship.
- Some hours in every semester can be considered for seminars/workshops on new developments/ technologies.

- If the clinical facility is not within the same campus, transportation should be provided to the students and interns.
- All practical skills must be supervised and recorded in a digital Logbook and skills to be evaluated after the completion of the internship.

9. Masters program should be promoted to develop specialization in the field and generate trained faculty in the field

- All Master programs must focus on research and engage with industry partners to promote innovation and development in the field
- Industry experts can be engaged as guest faculty/ conduct seminars under the framework of programs.

10. It was agreed upon that an exit examination (includingtesting of skills and competencies) can be potentially conducted by a third-party agency or organization as eventually identified by the ICAHP/ NCAHP. This can also evolve as a licensure examination for Optometry professionals.

An update from the existing CMOC was done with the support of the new taskforce members. The Ministry has appointed new members of the task force from various regions of India to ensure wide geographic representation, catering to diverse needs across the nation. Feedback on amendments to the syllabus scheme, including program duration, incorporation of recent developments in courses, alterations in course positioning and credit distribution, was solicited from task force members and institutional representatives. Meetings were convened multiple times, totaling approximately 12 to 15 sessions, each lasting 2 to 3 hours, resulting in a cumulative effort of 30 to 40 hours to finalize the curriculum. Additionally, input was sought on assessment methods and faculty requirements, with relevant updates made to textbooks. Competencies pertaining to knowledge, skills, and attitudes were delineated for both undergraduate and postgraduate programs. Following the submission of the curriculum by the task force to the Ministry, it was made available to the public for feedback. A total of 94 opinions were received, which were subsequently forwarded by the Ministry to the task force for their review. Following public feedback, task force members extensively deliberated on each aspect over 7 to 8 meetings, spanning approximately 20 to 25 hours. Subsequently, after thorough examination and discussion, the new curriculum was formulated.

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Chapter 3
Background of the profession

Chapter 3: Background of the profession

Statement of Philosophy– Why this profession holds so much importance

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).4

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 Organization and the International Agency for the Prevention of Blindness (IAPB) launched Vision 2020: The Right to Sight" in 1999 to prevent blindness. While acknowledging progress in the last decade to combat blindness, IAPB proposed "2030 In Sight" to ending avoidable blindness across various countries.5 There are currently 1.1 billion people living with vision impairment worldwide but without access to services. Appropriate interventions are required to tackle this enormous burden, which otherwise will rise to 1.8 billion people by 2050.

"World Report on Vision" released by the World Health Organization calls for unified efforts in bringing down blindness and vision impairment through 'integrated people centered eye care' that would target 'universal health coverage and march towards achieving the third Sustainable Development Goal: Health and Wellbeing for all. 4

IAPB proposed through its action plan document on '2030 In Sight' about the ways in which plans need to be geared to achieve the goals of eye health and making eye health a priority through three important steps, "Elevate", "Integrate" and "Activate".5

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The two key areas that were launched by the World Health Organisation during World Sight Day 2022 were the eREC and eCSC. i.e. effective Refractive Error Coverage and effective Cataract Surgical Coverage.[6] The contributions of optometrists in the eREC needs no mention. It is important that optometrists are pivotal in tackling the huge demand of refractive errors and the vision impairment caused by the uncorrected refractive errors. Strategic efforts are important to tackle the huge burden and also impart professional refractive services to all. In this process it is important that optometrists would be able to provide comprehensive services rather than just refractive services alone.

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 contribute at secondary and tertiary levels where possible, working with ophthalmologists and other eye care providers towards the unified goal of combating blindness.

Recognition of Title and qualification[7]

The recommended title for this group of professionals stands as the 'Optometrist'.

Optometrists can choose several paths in their professional career. As other healthcare professionals, besides independent practice, they can choose academic or corporate careers in the growing eye and vision care industry.

Career Advancement Scheme (CAS)

In the academic path, career advancement scheme has been clearly laid down by NCAHP. Irrespective of the paths chosen, at entry level with a basic Bachelor of Optometry degree job openings may be available, but to grow in the profession, years of experience, coupled with post-graduation degrees may provide better opportunities. Academic performance indicators as per the NCAHP recommendations, key performance indicators as per the private sector may be followed.

As per the scope of Optometry practice, the job sectors are divided into the following areas:

A. Corporate sector
B. Independent practice
C. Work for an optical chain or under an optical store
D. Public health
E. Industries/companies
F. Eye care hospitals & institutions
G. Education sector
H. Scientific research
I. Basic research and integrated professional areas

A. *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 optometrists have also risen to regional heads (Asia-pacific head).

B. *Independent practice*: As per the current practice standards and the NCAHP Act 2021, Optometrist can upon graduation open their independent clinics. Optometrists can also independently provide Tele consultation.

C. Work for optical outlet / store: The work environment and the responsibilities for working in an outlet / store would be similar to that of an independent practitioner.

D. *Public Health*: Optometrist as health care provider, may involve in epidemiological studies and collaborate with NGOs in service delivery of health care.

E. *Sports*: Optometrists may access and train in sports vision along with other professionals. The science of helping sportsmen reach peak levels of performance through the enhancement of visual systems.

F. *Industries/ Companies*: Optometrists 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. Optometrist also gives Vision related Fitness certificate for all occupations.

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Clinical/ Public Health	Industry (Professional services/ marketing)	Eligibility and experience for direct recruitment	Eligibility and experience for promotion	Annual performance appraisal
Optometrist	Assistant Manager Professional Services	Clinical : B Optom or equivalent Industry: B Optom		Clinical: Proficiency CR, HOD appraisal/year , Achieving recommended CE credits Industry: Review by immediate supervisor, country lead, and HR guideline based on achievement against predefined KPIs
Consultant Optometrist	Manager Professional Services	Clinical: B Optom, M Optom	Clinical: Five years of experience as optometrist, Completion of additional degree	Clinical: Proficiency CR, Self-appraisal, HOD / Principal appraisal/year Achieving recommended CE credits, completion of fellowships, conference presentations

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		Industry: Optom Grad with 3-5 yrs experience	Industry: Achievement of KPIs	Industry: Review by immediate supervisor, country lead, and HR guideline based on achievement against predefined KPIs
Consultant Optometrist (Senior scale)/ Superintendent Optometrist	Senior / Area Manager Professional Services	Clinical: Five years of clinical experience with M Optom Industry: Optom Grad with 5-10 yrs experience Additional business / marketing skills	Clinical: Five years of experience as Consultant optometrist. M Optom is necessary for promotion to Consultant optometrist Industry: Achievement of KPIs	Clinical: Proficiency CR, HOD appraisal/ year, Achieving recommended CE credits, completion of fellowships, conference presentations Industry: Review by immediate supervisor, country lead, and HR guideline based on achievement against predefined KPIs

Senior Consultant Optometrist	Associate Director, Professional Services (country)	Clinical: Eight years of experience with M Optom Industry: PG Optometry with 12+ yrs experience Relevant business / corporate skills	Clinical: Five years of experience as Superintendent Optometrist/ Consultant Optometrist (Senior scale) Or Completion of additional degree in optometry or relevant health discipline like public health/ psychology etc. Industry: Achievement of KPIs	Clinical: Proficiency CR, HOD appraisal/year, Achieving recommended CE credits, completion of fellowships, conference presentations Industry: Review by Country lead, Asia Region Prof Services Lead and HR guideline based on achievement against predefined KPIs for that year
Chief Optometrist	Associate Director Professional Services (group of countries)	Clinical: Fifteen years of experience with M Opt	Clinical: Five years of experience as Senior Consultant Optometrist. Completion of additional or degree in optometry or relevant health discipline	Clinical: Proficiency CR, HOD appraisal/year, Achieving recommended CE credits, completion of fellowships, conference presentations

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		Industry: PG Optometry with Relevant business / cross sector project experience	like public health/ psychology etc. Industry: Achievement of KPIs	Industry: Review by Country lead, Asia Region Prof Services Lead and HR guideline based on achievement against predefined KPIs for that year
Head of Optometry	Director Professional Services (country OR group of countries)	Clinical: Twenty years of experience with M Opt or M Phil Optometry Industry: PG Optometry with Relevant industry / cross sector project experience	Clinical: Five years of experience as Chief Consultant Optometrist or Completion of additional degree in optometry or relevant health discipline like public health/ psychology etc. Industry: Achievement of KPIs	Clinical: Judgement on all aspects of Optometry and Protocol development on treatment delivery and quality assurance Industry: Review by Country lead, Asia Region Prof Services Lead and HR guideline based on achievement against predefined KPIs for that year

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Director-Optometry	Vice President, Professional Services	Clinical: Twenty years of experience with M Opt Industry: PG Optometry with relevant industry / cross sector project experience	Clinical: Five years of experience as Director Industry: Leadership and successful career across different industries in Eye care	Clinical: Judgement on all aspects of Optometry and Protocol development on treatment delivery and quality assurance

G. *Eye Care Hospitals & Institutions***:** Optometrist play an important role to decrease the OPD patient burden on ophthalmic surgeons by providing primary eye care services such as comprehensive eye examination to detect, diagnose and co-manage. Optometrists working in hospitals and institutions offer services similar to independent practice, as mentioned above. In addition, acts as clinical trainer, researcher, scientist, administrator, clinical head or other suitable role as demanded.

H. *Educational Sector:* In educational sector, Optometrists employed as an academic/research/administrative faculty depending on experience and qualification as per the NCAHP guidelines. In educational sector, School of Optometry is headed by this recognised profession only.

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

J. *Tele-health:* Optometrists develop various digital applications/solutions for eye/vision care needs.

K. *Transformational/Translational research:* Optometrists with higher degree may 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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A: Levels for careers in Clinic and Industry:

Clinical category: Job Description at various levels

- Comprehensive eye examinations.
- Being a part of Specialty optometry clinics, Clinical Training for B Optom.
- Clinical Training for B Optom, Handling specialty Clinics Independently.
- Clinical Training for M Optom, Handling specialty Clinics Independently.
- Residency training for fellows and M Optom, Handling specialty Clinics Independently.
- Residency training for fellows and M Optom, Residency management.
- Independent management of an optometry clinic (Initiating and implementing a clinic/specialty clinic)

Industry career – can be grouped into 2 categories based on patient facing / ECP facing role

A. Retail industry (service to patient / customer) = Optical chains along with optical business division

B. Product manufacturers (Corporate company to Eye Care Professional)

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B: Levels for careers in Academics and Research:

Academic	**Eligibility and experience requirement (on Direct recruitment)**	**Eligibility and experience requirement (on Promotion as per *NCAHP* -CAS-Career Advancement Scheme)**
Clinical Instructor	B Optom or equivalent with a minimum clinical experience of 2 years	N.A
Assistant Professor-I	Bachelor's Degree in Optometry (B.Optom), Master's Degree in Optometry (M.Optom) with at least 55% marks (or an equivalent grade in a point scale wherever the grading system is followed) from a recognized University.	N.A.
Assistant Professor-II (Senior Scale)	N.A.	M.Optom degree with 3 years' experience as **Assistant Professor-I**
Assistant Professor-III (Selection Grade)	N.A.	3 years' experience as Assistant Professor-II
Associate Professor	Essential: A Master's Degree in Optometry (M.Optom) with eight years' experience as Assistant Professor. Desirable: i) Higher Qualification, such as Ph.D. degree in any discipline of Optometry recognised by the NCAHP UGC, and published work of high standard in peer-reviewed journals.	2 years experience as Assistant Professor-III (Selection Grade)

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Professor	Essential: Master's Degree in Optometry (M.Optom), with thirteen years experience. Desirable: i) Higher Qualification like Ph. D. in any subject of Optometry recognised by NCAHP, and ii) Published work of high standard in peer –reviewed journals.	8 years experience as **Associate Professor**
Senior Professor	N.A.	5 years' experience as **Professor**
Dean	Essential: Master's Degree in Optometry (M.Optom) with twenty eight years total experience, including five years' experience as Professor (Optometry). Note: i) Senior-most Professor shall be designated as the Principal /Dean. ii) Desirable: Higher qualification like Ph.D. in any subject of Optometry recognized by the NCAHP and published work of high standard in peer reviewed journals.	7 years' experience as Senior **Professor**

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Academic Levels for Direct Recruitment

C: Levels for careers in Research

Research	**Eligibility and experience for Direct recruitment***	**Eligibility and experience for promotion***
Scientist –B	B Optom or equivalent with a minimum clinical experience of 2 years	N.A.
Scientist -C/Scientist	B Optom, M Optom	N.A.
Scientist -D/ Scientist	Five years of experience as Scientist-C/Scientist.	Five years of experience as Scientist-C /Scientist
Scientist –E/ Scientist/ Sr. Scientist	Five years of experience as Scientist -D/ Scientist	Five years of experience as Scientist -D/ Scientist
Scientist –F/ Scientist/ Sr. Scientist	Fifteen years of experience as Scientist D/ Scientist PhD is mandatory for Scientist -F/ Scientist/ Sr. Scientist	Five years of experience as Scientist E/ Scientist/ Sr. Scientist
Scientist –G/ Research Head/ Principal Scientist	Fifteen years of experience as Scientist	Five years of experience as Scientist F/ Scientist/ Sr. Scientist
Additional Director General	20 years of experience as Scientist	Two years of experience as the Scientist –G/ Research Head/ Principal Scientist

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1.4 Responsibilities of an optometrist: (Reference: Indian Entry Level Optometry Competency Skills document as stated in Chapter 5 below**)**

1. Keep patients' eye, vision and general health as first priority
2. Respect the rights and dignity of patients regarding their health care decisions
3. Advise the patients whenever consultation with, or referral to, another optometrist or other healthcare professional as appropriate
4. Ensure confidentiality and privacy of patients' health and other personal information
5. Strive to ensure that all people have access to eye and vision care
6. Advance professional knowledge and skills
7. Maintain practice in accordance with professional health care standards
8. Promote ethical and cordial relationships with all members of the health care community
9. Uphold the dignity, honour and integrity of the optometric profession

1.4.1 Roles and Responsibilities :

1.4.1.1.1 OPTOMETRY

1. Examination, prescribing, management, and dispensing of various optical aids – spectacles, contact lens, low vision aids/assistive devices – for people of all age groups.
2. Diagnosis, management/co-management of ocular and related systemic diseases/conditions for people of all age groups.
3. Diagnosis and management of Non Strabismic/strabismic binocular vision anomalies through non-invasive procedures.
4. Eye care services at community level – examples: school screening, cataract screening, glaucoma screening, diabetic retinopathy screening, occupational optometry, Doorstep eye care.
5. Optometric/ Genetic counselling on eye care of patients with partial sight, including colour blindness and hereditary eye diseases.
6. Public education on eye care, ocular hygiene, nutrition and environmental effects on eye.
7. Examination and visual rehabilitation of patients with low vision and profound visual impairment.)

Definition of Optometrist

"Optometrists are primary health care practitioners of the eye and visual system who provide comprehensive eye and vision care, which includes refraction and dispensing, detection/diagnosis and co-management of disease in the eye and the rehabilitation of conditions of the visual system"

Optometrist also means a person having-

i. Graduate degree in optometry obtained after the completion of a full time on campus course of 5 years which includes supervised clinical training from any university recognized by the University Grants Commission established under the University Grants Commission Act 1956; or

ii. Post graduate degree in optometry after completion of a full time on campus course of two years and /or PhD in the same.

iii. Diploma in Optometry will be encouraged to upgrade to degree through lateral entry courses till an accepted timeline. After this period they will not be designated as Optometrist. The program will be phased out thereafter.

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 Group : Other Health professionals (226) ; Unit Group : Optometrist (ISC code-2267))at Skill Level 4 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 5a or higher)

Education of the Optometry

When developing any education programme it is necessary that programme planning should be outcome-based, meeting local and national manpower requirements, personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge and skills to competency based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.

Thus, the following curriculum aims to focus on skills and competencies based approach for learning and are designed accordingly. The curriculum is prescriptive and is designed with an aim to standardize the content across the nation. As stated above the focus of the profession is to create qualified and skill manpower in the field of Optometry through the following levels of higher education –

1. Bachelor of Optometry (B. Optom)
2. Master of Optometry (M. Optom)
3. PhD

Entry requirements

As per the ***NCAHP*** guidelines it is recommended that the students entering the Optometry programme at under graduate level should have completed the recognized secondary school studies as the qualification stipulated for B. Optom is 10+2 with Sciences (Biology/Mathematics) or equivalent from a recognized university or board with 50% marks in Physics, Chemistry, Biology/Mathematics which will provide the foundation for

and prepare them for higher education studies. The student should have minimum 17 years of age as on 31st December of the admission year.

Students entering the Optometry programme at post graduate level should have completed the Bachelor of Optometry in a regular full time on campus mode with a minimum of 60% marks from a recognised university.

Students entering the PhD program should be as per the ***NCAHP*** regulations.

Candidates who have completed diploma in optometry (after completion of 10+2 with science) or its equivalent can also join the undergraduate course. They would be eligible to join in 2nd year of optometry if the numbers of hours are in line with the bachelor's program of first year. The total education therefore would be (2 year diploma + 3 year of undergraduate studies). The final year of the program (lateral entry) would be internship.

Nomenclature

Nomenclature of both under graduate and postgraduate programs should be uniform across the country. The nomenclature for the undergraduate program is "Bachelor of Optometry" (B.Optom), whereas for a postgraduate program is "Master of Optometry" (M.Optom).

Course duration

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as an a professional course in optometry -

- 5 year programme (including 1 year of clinical training /internship)- Bachelor's degree level
- 2 year programme- Master's degree level
- PhD in relevant discipline (Optometry) should be in accordance with ***NCAHP*** regulations (Minimum standards and procedures for award of PhD degrees). Shodhganga theses repository/registration is also mandatory.

The emphasis initially should be on the academic content establishing a strong scientific basis and in the latter year on the application of theory to clinical/reflective practice. In Bachelor degree programme minimum one year should be devoted to clinical practice and this should be on a continuum of rotation from theory to practice over the programme. The aim of the 5 year degree programme is to enable the development of the Optometrist as a key member of the eye care team and to enable him/her to execute basic assessment/planning/delivery of eye care services.

With the change in the disease dynamics and multifold increase in the cases needing eye care treatment, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. Thus, **a master's degree programme is recommended with minimum of two years of education in specialized field of Optometry**.

The post graduate students can contribute significantly in research and academics. PhD plays a significant role in the academics / research systems. The current curriculum has indicated prescriptive guidelines for the career and qualification map.

Exit exam / Licensure exam:

There shall be a third party exit / licensure exam at the end of the Internship (5th year) for Bachelor's program. The exit examination, or licensure examination, serves as a requisite assessment for clinical practice eligibility. While the university may confer a degree completion certificate, it is contingent upon the successful clearance of the exit examination for clinical practice privileges within India. Additional criteria and regulations governing the exit examination are in accordance with the guidelines established by the National Commission for Academic and Health Professions (NCAHP).

Teaching faculty and infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.

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 1:10 and 1:3 to be followed for the undergraduate program and post-graduate programs respectively. The teaching load will be based on the norms set by the National and State Councils for the designated post.

Faculty development programs should be provided by the institute and undertaken by the faculty mandatorily on a regular basis.

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

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.

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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 quiet vast ranging from optics, contact lenses, binocular vision, glaucoma, retinal diagnostics, public health, low vision to primary eye and health care. Optometrists can involve himself 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 arises from laboratory, clinical or population studies lead into clinical applications to reduce disease incidence, morbidity and mortality.

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Chapter 4
Curriculum of Optometry courses

Chapter 4: Curriculum

Background

Human resource development for eye care is a crucial factor which will determine the success of the IAPB recommended vision of '2030 In Sight'. Given the enormous numbers of people in India who are blind and vision impaired as a result of uncorrected refractive error and other avoidable causes, the time is right for India to regulate the profession of optometry, and increase the numbers of skilled eye care providers who can provide vision care to the people at all levels and in all areas of the country.

The academic development of optometry in India is a crucial part of the development of effective vision care and blindness prevention system in India. Optometry in India could, over the next decade, become capable of combating its huge blindness and impaired vision problem by travelling down the academic, professional and legislative pathway to become an effective health care profession.

The aims of the recommended curriculum are to produce Optometrist who are-

- Technically and clinically competent;
- Understand the theoretical basis for evidence based practice;
- Independently competent in vision care as defined;
- Effective members of the multidisciplinary team;
- Prepared to participate in or initiate research into practice;
- Can work according to registration requirements on the respective continents.

All aspects of Optometry have been considered in the development of this curriculum together with the identification of the roles expected for different levels of Optometrist based on their qualification and experience. The need for connecting the dots between the education and employment practices has been the road map for devising this curriculum.

Foundation course has also been designed to bring all the students at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation course is mandatory for all the allied and

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healthcare professional courses, given that if it has been done at least at one level of qualification. For example-if a diploma holder has completed the foundation course and is willing to pursue the degree course, the candidate will directly get entry for next semester, however a pre- qualifier skill test will have to be satisfactorily completed, if not, then the candidate will have to undergo the first semester of foundation course again.

It is recommended that any program developed from this curriculum adhere to the following minimum duration to qualify as an entry-level professional in Optometry:

- **A 5-year program, inclusive of a one-year internship, at the Bachelor's degree level.**

Initially, the emphasis should be on academic content to establish a robust scientific foundation, with a later focus on the application of theory to clinical and reflective practice. Clinical postings should commence from the second year onwards in the Bachelor's degree program, following a continuum from theory to practical clinical experiences throughout the program.

The aim of the five-year degree program is to foster the development of Optometry professionals as independent healthcare practitioners and integral members of healthcare teams matching **"International standards"**. This includes the ability to perform advanced diagnosis, prepare, plan, deliver, and prescribe Optometry services, as well as ensure quality assurance.

Given the evolving disease dynamics and increased demand for Optometry services, it is imperative to encourage well-structured postgraduate education programs. These programs aim to enhance research capacity domestically and expand the scope of clinical practice within the profession. Consequently, a Master's degree program is recommended, with a minimum duration of two years focusing on specialized fields of Optometry. Postgraduate students are expected to make significant contributions to research and academia.

Furthermore, recognizing the significant role of PhD holders in the academic system of Optometry, guidelines for PhD programs are also suggested in this curriculum.

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4.1 Bachelor of Optometry

Introduction:

Learning Objectives: At the completion of this course, the student should -

1. Be able to develop skills to provide comprehensive eye examination.

a. To acquire knowledge on ocular structures, its functions and pathological changes
b. To carryout ophthalmic investigations
c. To impart knowledge with regard to common eye diseases
d. To impart knowledge on treatment modalities from the perspective of counselling
e. To acquire knowledge about the referral guidelines for ocular and systemic conditions

2. Be able to correct refractive error and provide spectacle prescription
3. Be able to fit, evaluate, prescribe and dispense contact lenses for refractive correction and other ocular conditions
4. Be able to assess the low vision and provide comprehensive low vision care
5. Be able to have adequate knowledge to develop skill in manufacturing of spectacle lenses, contact lenses and low vision devices.
6. Be able to do complete binocular vision assessment, manage non-strabismic binocular vision anomalies and refer condition which warrants surgery
7. Be able to assess the visual demands for various occupations and match it to the visual capabilities. Also be able to advice on eye safety wear for various occupations.
8. Have knowledge and skill for early detection of various ocular conditions and pathologies –Refractive error, Strabismus, Cataract, Diabetic retinopathy, Glaucoma etc.
9. Have knowledge regarding organizations of eye banks and preservation of ocular tissues.
10. Have knowledge on sensory substitution and other rehabilitation measures for totally visually challenged.
11. Have knowledge of counselling on visual/ocular hygiene, nutritional and environmental modifications

Expectation from the future graduates in the providing patient care.

1. Optometrist will work independently or in conjunction with other eye/health care professionals.
2. The optometrist will be knowledgeable, skilful and analytical in diagnosis, treatment planning, management of visual defects & impairments and in co-managements of ocular conditions.
3. The optometrist can work in hospitals (both private and public sectors), optical outlets and/or work as independent practitioner

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4. The course will lead to a basic degree in optometry, which is considered as the minimum essential for statutory registration of optometrists in countries where optometry has been brought under legislation.
5. Undertake public health optometry projects and vision screening eye camps in schools, colleges, urban slums, rural areas and also practice occupational optometry in industries.
6. Public education on ocular hygiene and related nutritional and environmental counselling.
7. Offer a helping hand and or efficiently manage and successfully run any ophthalmic clinic, optometry department in hospitals, optical shops, and offer product expertise in ophthalmic industry & trade.

Eligibility for admission:

Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50% marks) in physics, chemistry, biology/mathematics. Admission is done based on the NEET exam / equivalent exam conducted by the Government of India (for both UG and PG programs) followed by a counselling session.

OR

Diploma in Optometry after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics, chemistry and biology/mathematics provided the candidate has passed in each subject separately. **(Timelines for upgrading will be until 5 years from the date of approval of the current curriculum).**

2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology/Mathematics and English up to 12th Standard level with pass marks (equivalence to) 50% in physics, chemistry, biology/mathematics

3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects with pass marks of 50% in physics, chemistry, biology/mathematics
a. English, Physics, Chemistry, Botany, Zoology
b. English, Physics, Chemistry, Biology/Mathematics and any other language

4. He/she has attained the age of 17 years as on 31st December of the year of admission.

5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

a. During subsequent counselling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

b. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

c. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year of undergraduate optometry programme for candidates who have passed diploma in Optometry/ vision technician/ophthalmic assistant programs from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the related subjects have been studied at diploma level with appropriate transfer of credits.

Duration of the course

The B Optom undergraduate degree program is of five years duration (4+1) including one year of compulsory internship.

Duration of the course: 5 (4+1) years or 10 (8+2) semesters.

Total hours –6000 (didactics+ practical +internship)

Semesters - An academic year consists of two semesters

Odd Semester: June/July to November/December

Even Semester: November/December to April/May

Medium of instruction:

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

Principal/Head of the Institute

In an affiliated college, Principal or Head of the institute must be an Optometrist. In a University set up, HOD must be an Optometrist. Dean must belong to Allied and Healthcare professions as mentioned in the NCAHP Act.

Attendance:

A candidate has to secure minimum-

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

Assessment:

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.

Competency Standards

Classification Units of Competency Skills at Entry level for optometrists

1. Communication Skills
2. Professional Conduct
3. Patient Examination and management.
4. Optical Dispensing
5. Documentation

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Bachelor of Optometry [5 year program]

Proposed Scheme

Year	Semester	Hours
1	1	450
1	2	450
2	3	450
2	4	450
3	5	450
3	6	450
4	7	450
4	8	450
5	9	1200
5	10	1200
Total		6000

Credit details:

One credit implies one hour lecture per week or two hours of laboratory/practical per week or two hours of clinics per week or two hours of Research project per week

A semester is considered to have 15 weeks. For example,

1 credit course = 15 hours of lectures per semester

3 credits course = 45 hours of lectures per semester

0.5 credit course = 15 hours of practical/laboratory.

CL	CP	L	P
3	0.5	45	15

CL: Credit for Lecture

CP: Credit for Practicals

L: Hours for Lecture

P: Hours for Practicals

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Curriculum Outline

First Semester

Sl. No.	Course Titles	Hours/semester		
		Lecture	**Practicals**	**Total**
BOP101	General Anatomy	45	15	60
BOP102	General Physiology	45	15	60
BOP103	General Biochemistry	45	15	60
BOP104	Physical Optics	45	15	60
BOP105	Mathematics & Geometrical Optics-I	45	15	60
BOP106	Introduction to Optometry#	30	0	30
BOP107	Nutrition#	15	0	15
BOP108	Communication#	15	60	45
BOP109	Clinical Optometry I	0	30	60
TOTAL		**285**	**165**	**450**

Non-university exams

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Second Semester

Sl. No.	Course Titles	Hours/semester		
		Lecture	Practicals	Total
BOP201	General Pharmacology	45	0	45
BOP202	General Pathology	30	0	30
BOP203	Ocular and related neuroanatomy	45	15	60
BOP204	Ocular and related neurophysiology	45	30	75
BOP205	Ocular Biochemistry	45	30	75
BOP206	Geometrical Optics-II	45	30	75
BOP207	Basics of Computers[#]	0	30	30
BOP208	Clinical Optometry-II	0	60	60
TOTAL		**255**	**195**	**450**

Non-university exams

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Third Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP301	General and Ocular Microbiology	45	15	60
BOP302	Ocular Pharmacology	45	0	45
BOP303	Visual optics –I	45	30	75
BOP304	Optometric optics	45	30	75
BOP305	Ocular Disease –I	45	0	45
BOP306	Indian Medicine and Telemedicine[#]	30	0	30
BOP307	Clinical Optometry-III	0	120	120
TOTAL		**255**	**195**	**450**

Non-university exams

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Fourth Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP401	Optometric Instruments	45	15	60
BOP402	Clinical examination of visual system	15	60	75
BOP403	Visual perception and psychophysics	30	15	45
BOP404	Visual Optics- II	45	30	75
BOP405	Ocular Disease –II	45	0	45
BOP406	Behavioral Health Psychology[#]	15	0	15
BOP407	Introduction to Quality & Patient safety[#]	15	0	15
BOP408	Clinical Optometry-IV		120	120
TOTAL		**210**	**240**	**450**

Non-university exams

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Fifth Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP501	Systemic Disease	30	0	30
BOP502	Dispensing Optics	30	30	60
BOP503	Geriatric Optometry	45	0	45
BOP504	Paediatric Optometry	45	15	60
BOP505	Diagnostics and therapeutics of Anterior Segment diseases	60	15	75
BOP506	Innovation and technology[#]	15	15	30
BOP507	Clinical Optometry V	30	120	150
TOTAL		**255**	**195**	**450**

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Sixth Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP601	Contact lens –I	30	30	60
BOP602	Low Vision care and Rehabilitation	30	30	60
BOP603	Binocular Vision- I	30	30	60
BOP604	Diagnostics and therapeutics of Posterior segment diseases	60	15	75
BOP605	Optometry and Multidisciplinary aspects of Health[#]	15	0	15
BOP606	Research Methodology & Biostatistics[#]	30	0	30
BOP607	Clinical Optometry VI	30	120	150
TOTAL		**225**	**225**	**450**

Non-university exams

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Seventh Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP701	Contact Lens –II	30	30	60
BOP702	Binocular Vision –II	30	30	60
BOP703	Public Health & Epidemiology	30	0	30
BOP704	Law and Professional ethics-Optometry. #	15	0	15
BOP705	Community eye health#		45	45
BOP706	Clinical Optometry VII	30	120	150
BOP707	Research Project – I #	0	90	90
TOTAL		**135**	**315**	**450**

Non-university exams

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Eighth Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP801	Occupational optometry	30	15	45
BOP802	Practice Management	30	0	30
BOP803	Community eye health and Tele-optometry[#]	15	60	75
BOP804	Data science for healthcare[#]	15	15	30
BOP805	Clinical Optometry VIII	30	120	150
BOP806	Research Project – II	0	120	120
TOTAL		**120**	**330**	**450**

Non-university exams

Ninth and tenth Semester (Considering 24 weeks per semester)

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practicals	Total
BOP901	B Optom Internship -I	45	1155	1200
BOP1001	B Optom Internship -II	45	1155	1200
				2400

Non-university exams

- An appropriate nominal amount shall be paid as stipend for the intern students. This should be revised periodically.

First Semester

GENERAL ANATOMY

CL	CP	L	P
3	0.5	45	15

INSTRUCTOR IN CHARGE: MD Anatomy, M Sc Anatomy or M Optom with experience in handling Anatomy.

COURSE DESCRIPTION: General anatomy deals with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

OBJECTIVES: At the end of the semester, the student should be able to:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.

2. Identify the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions.

3. Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyze the integrative and regulative functions on the organs and systems.

TEXT BOOKS:-

1. B.D. CHAURASIA: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.
2. Inderbir Singh's text book of Anatomy -3 volumes 7th Edition

REFERENCE BOOKS:-

1. PETER L. WILLIAMS AND ROGER WARWICK: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.

2. T.S. RANGANATHAN: Text book of Human Anatomy, 1982, S. Chand & Co., New Delhi 110 055.

3. INDERBIR SINGH: Human Embryology, 3rd Ed., Macmillan India, 1981.

4. R. KANAGASUNTHARAM, P. SIVANANDA-SINGHAM & A. KRISHNAMURTI: Anatomy- Regional, Functional, & Clinical, P.G. Publisher, Singapore 1987.

PREREQUISITES: Higher secondary level biology or remedial biology

COURSE PLAN:

Unit	Topic	Hours
1	Introduction to Human Anatomy: Anatomy: Definition and its relevance in medicine and optometry Planes of the body, relationship of structures, organ system Skeletal System	9
2	Tissues of the Body: Epithelium, connective tissue, bone and cartilage, Embryology, histology, different types of each of them, types of cells, cellular differentiation and arrangements in different tissues Muscles: Different types of muscles, their functional differentiation, their relationship with different structures, their neural supply	9
3	Blood vessels: Differentiation between arteries and veins, embryology, histology of both arteries and veins, Functional differences between the two, anatomical differences at different locations Lymphatic system: Embryology, functions, relationship with blood vessels and organs	9
4	Skin and appendages: Embryology, anatomical differences in different areas, functional and protective variations, innervations, relationship with muscles and nerves Glands: Embryology, different types of glands (exocrine and endocrine), functional differences, neural control of glands	9
5	Nervous system: Parts of Nervous system, cell types of nervous system, Blood-brain barrier, Reflex arc, Peripheral Nerves, Spinal nerves, Nerve fibers, Autonomic Nervous system Brain and Cranial nerves: Major parts of Brain, Protective coverings of the Brain, Cerebrospinal Fluid, Brain stem, Cerebellum, Diencephalon, Cerebrum, Cranial nerves	9

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PRACTICAL: Practical demonstration of each organ using specimen. If specimen for certain organs are not available, then videos can be shown to make the student understand the anatomic structures.

CL	CP	L	P
3	0.5	45	15

GENERAL PHYSIOLOGY

INSTRUCTOR IN CHARGE: MD Physiology, MSc Physiology or M Optom with experience in handling Physiology

COURSE DESCRIPTION: General physiology deals with the entire human anatomy with emphasis on different organ systems, their physiological functions with special emphasis on blood and neurophysiology.

OBJECTIVES: At the end of the course the student will be able to: • Explain the normal functioning of various organ systems of the body and their interactions. • Elucidate the physiological aspects of normal growth and development. • Describe the physiological response and adaptations to environmental stresses. • Know the physiological principles underlying pathogenesis of disease.

TEXT BOOKS: -

1. Human physiology - C C Chatterjee 14th edition 2 volumes
2. Essentials of human physiology - K Sembulimgam 8th edition

REFERENCE BOOKS:-

1. A C Guyton: Text book of Medical Physiology, 8th edition, saunders company, Japan,

2. G J Tortora, B Derrickson: Principles of anatomy & physiology,11th edition, Harper & Row Publishers, New York

3. John Wiley & Sons Inc, New Jersey, 2007

PREREQUISITES: Higher secondary level biology or remedial biology

COURSE PLAN:

Unit	Topics	Hours
1	Cell structure & organization Tissue organization, Epithelium, Connective tissue –Collagen fibers –Elastic fibers –Areolar fibers, Cartilage –Bone, Contractile tissue –striated –skeletal –cardiac –non striated –plain –myoepithelial, General principles of cell physiology, Physiology of skeletal muscle	7
2	Blood: Composition, Volume measurement & variations, Plasma proteins –classification & functions, Red blood cells –development, morphology & measurements –functions & dysfunctions., White blood cells –development –classification, morphology –functions & dysfunctions, Platelets –morphology –development, functions & dysfunctions, Clotting –factors –mechanism –anti- coagulants dysfunctions, Blood grouping –classification –importance in transfusion, Rh factor & incompatibility, Suspension stability, Osmotic stability, Reticulo endothelial system: Spleen,lymphatic tissue, Thymus, bone marrow, immune system, cellular, Humoral, Autoimmune system	9
3	Digestion: General arrangement, functions & regulations: Salivary digestion, Gastric digestion, Pancreatic digestion, Intestinal digestion, Liver & bile, Absorption, Motility, Deglutition, Vomiting-Defecation-Functions of large intestine-Neurohumoral regulations of alimentary functions Excretion: Body fluids –distribution, measurement & exchange, Kidney –structure of nephron –mechanism of urine formation –composition of the urine and abnormal constituents –urinary bladder & micturition	9

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4	Endocrines: Hormone mechanism –negative feed backs –tropic action –permissive action –cellular action, hypothalamic regulation, hormones, actions, regulations: Thyroid , Adrenal cortex, Adrenal medulla, Parathyroid, Islets of pancreas, Miscellaneous, Common clinical disorders Reproduction: Male reproductive system –control & regulation , Female reproductive system –uterus –ovaries –menstrual cycle –regulation –pregnancy & delivery –breast –family planning Respiration: Mechanics of respiration –pulmonary function tests –transport of respiratory gases- neural and chemical regulation of respiration –hypoxia, cyanosis, dyspnoea–asphyxia.	10
5	Circulation: General principles Heart: myocardium –innervation –transmission of cardiac impulse- Events during cardiac cycle –cardiac output. Peripheral circulation: peripheral resistances –arterial blood pressure –measurements –factors regulation variations –capillary circulation –venous circulation. Special circulation: coronary cerebral –miscellaneous Nervous system: Neuron –Conduction of impulse –synapse –receptor, Sensory organization –pathways and perception, Reflexes –cerebral cortex –functions, Thalamus –Basal ganglia, Cerebellum., Hypothalamus, Autonomic nervous system –motor control of movements, posture and equilibrium, conditioned reflex, eye hand co-ordination, Special senses –(Elementary) Olfaction –Taste –Hearing	10

PRACTICAL*:

1. Blood test: Microscope, Haemocytometer, Blood, RBC count, Hb, WBC count, Differential Count, Haematocrit demonstration, ESR, Blood group & Rh. type, Bleeding time and clotting time

2. Digestion: Test salivary digestions

3. Excretion: Examination of Urine, Specific gravity, Albumin, Sugar, Microscopic examination for cells and cysts

4. Endocrinology and Reproduction: Dry experiments in the form of cases showing different endocrine disorders.

5. Respiratory System: Clinical examination of respiratory system, Spirometry, Breath holding test

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6. Cardio Vascular System: Clinical examination of circulatory system, Measurement of blood pressure and pulse rate, Effect of exercise on blood pressure and pulse rate

7. Central Nervous System: Sensory system, Motor system, Cranial system, Superficial and deep reflexes

*Videos can be shown to make the student understand the functions

GENERAL BIOCHEMISTRY

CL	CP	L	P
3	0.5	45	15

INSTRUCTOR IN CHARGE: Ph D or MD in biochemistry with adequate exposure to the profession of optometry or M Optom with experience in handling Biochemistry

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.

OBJECTIVES: At the end of the course, the student should be able to: demonstrate his knowledge and understanding on:

1. Structure, function and interrelationship of biomolecules and consequences of deviation from normal.

2. Integration of the various aspects of metabolism, and their regulatory pathways.

3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

TEXT BOOK:

1. Essentials of biochemistry - Shivananda Nayak 3rd edition

2. Textbook of biochemistry for medical students - D M Vasudevan 8th edition

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990

2. D.R. Whikehart: Biochemistry of the Eye, 2ndedition, Butterworth Heinemann, Pennsylvania, 2003

PREREQUISITES: Higher secondary level chemistry with good knowledge of organic chemistry.

COURSE PLAN

Unit	Topics	Hours
1	Amino acids - classification, symbols, structures and properties - Proteins – primary structure, secondary structure, tertiary structure and quaternary structure - examples with biological functions Carbohydrates - classification, structure and functions of mono-, di-, oligo- and polysaccharides - Glycoconjugates - proteoglycans, glycoproteins and glycolipids Lipids - structure and functions of fatty acids, triacylglycerols, phospholipids and glycolipids	9
2	Enzyme nomenclature - derivation of Michaelis-Menten equation, significance and its limitations, Lineweaver-Burk equation and its plot - factors affecting the rate of enzymatic reactions - enzyme regulation - covalent modification, allosteric modification, positive and negative co-operativity - enzyme inhibition - reversible and irreversible inhibitions. Mechanism of enzyme catalysis - proximity effect, general acid-base reaction, electrostatic interaction, etc., that recurs in enzyme reactions; mechanism of action of chymotrypsin, lysozyme, ribonuclease-A and carboxypeptidase	9
3	Carbohydrate metabolism - glycolysis (aerobic and anaerobic), feeder pathways of glycolysis, gluconeogenesis, glycogenolysis, glycogenesis, pyruvate oxidation, TCA cycle, glyoxylate cycle and pentose phosphate pathway - pathway, control and energetics Nucleic acids metabolism - Purines and Pyrimidines- synthesis, degradation and its control	9

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4	Amino acids metabolism - transamination, oxidative deamination, urea cycle, breakdown of amino acids leading to pyruvate, acetyl CoA, α-ketoglutarate and succinyl CoA – lipids metabolism - fatty acids, phospholipids and cholesterol - synthesis, degradation and its control	9
5	Electron transport chain and its complexes; oxidative phosphorylation: chemiosmotic theory; proton motive force, ATP synthesis - rotational catalysis; uncouplers of oxidative phosphorylation; control of ATP production	9

PRACTICALS

- Estimation of amino acid by Formol titration
- Estimation of starch by Anthrone method
- Estimation of protein by Lowry's method from germinating seeds
- Estimation of cholesterol by Zak's method
- Estimation of amino acid by Ninhydrin method from germinating seeds
- Estimation of ascorbic acid
- Estimation of Urea by DAM-TSC method
- Determination of enzyme activity – AST
- Determination of enzyme activity – ALT
- Identification of amino acids by descending paper chromatography
- Identification of sugars by TLC
- Demonstration
- Estimation of blood cholesterol
- Estimation of alkaline phosphatase.
- Salivary amylase (effect of PH, etc)

CL	CP	L	P
3	0.5	45	15

PHYSICAL OPTICS

INSTRUCTOR IN CHARGE: A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines Or M Optom/ Ph D in Optometry with experience in handling Optics

COURSE DESCRIPTION: This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail.

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

TEXT BOOK: Keating NM. P, Geometric, Physical and Visual Optics, Butterworth-Heinemann, Massachusetts, USA, 2002.

REFERENCE BOOKS:

1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.
3.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN

Unit	Topics	Hours
1	Nature of light –light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. Sources of light; Electromagnetic Spectrum, Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units. Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination; Trolands	9
2	INTERFERENCE: Interference of Light – Principle of Super Position - Coherence, Coherent, sources, Constructive interference, Destructive interference - Young's double slit Experiment– band width – Colors of Thin Films – Newton's Rings – Determination of Wavelength – Air wedge - Determination of diameter of a thin wire by air wedge Michelson's Interferometer and its Applications.	9

3	DIFFRACTION: Fresnel's Diffraction – Zone Plate and a Convex Lens – Diffraction at Circular aperture, Opaque circular disc, Straight edge and Narrow wire -. Fraunhofer's Diffraction – Diffraction at a Slit, Circular Aperture and Disc – Theory of Plane Transmission Grating. Resolution of Images – Rayleigh's Criterion – Resolving Power of Telescope, Microscopes, Prisms and Grating.. Scattering; Raleigh's scattering; Tyndall effect.	9
4	POLARIZATION: Double Refraction – Brewster's Law – Nicol Prism –- polarizer and analyzer - Huygens Explanation of double refraction – Elliptically & Circularly polarized light – Quarter Wave and Half Wave Plates - Polaroids and their uses -Optical Activity –Fresnel's Explanation – Bi quartz Polarimeter – Determination of Specific Rotatory Power using Half Shade Polarimeter. Fluorescence and Phosphorescence- Introduction to Fluorescence and Phosphorescence, Applications of Fluorescence	9
5	LASERS: Introduction –Basic Principle of LASER – spontaneous and stimulated emission, Coherence –Population Inversion – Different Types of Pumping –Systems – characteristics of LASER . Types of Laser: He-Ne Laser – Nd-YAG laser – CO2Laser – Semiconductor Laser - 3-D Profiling Using Lasers – Applications of Laser in Field of Medicine – ophthalmic applications.	9

PRACTICALS

The practical to be done include the following:

- Determination of Refractive Index of the given Liquid – Newton's Ring
- Refractive Index of Hollow Prism
- Small Angle Prism
- Resolving Power of Prism
- Polarimeter - Specific Rotation
- Diffraction using Single Slit and Double Slit - determine its width.
- Determination of Wavelength of He-Ne - Laser Grating
- Michelson's Interferometer - determine the wavelength
- Circular Aperture - Airy disk, dependence of disk diameter on aperture size
- Verification of Malus' Law using a polarizer – analyzer combination
- Thickness of thin glass plate Michelson'sInterferometer
- Photometry of Images: Verification of Inverse Square Law; Effect of aperture size on image illuminance

MATHEMATICS & GEOMETRICAL OPTICS-I

CL	CP	L	P
3	0.5	45	15

INSTRUCTOR IN CHARGE:

Mathematics: A post-graduate, preferably a PhD, in mathematics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR M Optom/Ph D in Optometry with experience in handling mathematics and optics

Geometrical optics: A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION:

Mathematics deals with the basics that are necessary for understanding the concepts of vision. Geometric Optics is the study of light and its behavior as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVE:

The objective of the mathematics units is to introduce the basic principles of mathematics involved in optometry, optics and other applied diagnostic divisions of optometry. The objective of the geometric optics units is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

2. B. S. Grewal, Higher Engineering Mathematics, 43/e, Khanna Publishers, 2014.

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.

2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

Course plan:

Unit	Topic	Hours
1	Trigonometry: Complex numbers, DeMoivre's Theorem and important deductions, Trigonometric and exponential forms of complex numbers and applications. Expansion of sinq, cosq and tanq in terms of q. Algebra: Combinations; Binomial theorem for any index	9
2	Definition of scalars, vectors and matrices. Addition and subtraction of vectors and matrices; vector norm and matrix determinants. Dot and cross products; angle between vectors. Multiplication of two matrices. Inverse of matrices; solution of simultaneous linear equations using matrices. Concepts of groups, rings and vector spaces. Definition of linearity and applications	9
3	Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance. Refractive index; its dependence on wavelength. Fermat's and Huygen's Principle –Derivation of laws of reflection and refraction (Snell's law) from these principles	9
4	Plane mirrors –height of the mirror; rotation of the mirror, Reflection by a spherical mirror –paraxial approximation; sign convention; derivation of vergence equation, Imaging by concave mirror, convex mirror, Reflectivity; transmissivity; Snell's Law, Refraction at a plane surface, Glass slab; displacement without deviation; displacement without dispersion	9
5	Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism, angular dispersion; dispersive power; Abbe's number, Definition of crown and flint glasses; materials of high refractive index, Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index	9

PRACTICALS

- Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index
- Thin Prism – measurement of deviation; calculation of the prism dioptre
- Fresnel's Biprism - determine the wavelength of a monochromatic light source
- Refractive Index of Solid Prism
- Image formation by spherical mirrors.

CL	CP	L	P
2	0	30	0

INTRODUCTION TO OPTOMETRY

INSTRUCTOR IN CHARGE: M Optom in Optometry with experience in teaching basic or core optometry courses.

COURSE DESCRIPTION: This course aims to orient the students with basic concepts of optometry, highlighting its role and importance in comprehensive ocular evaluation

OBJECTIVES:

1. This course provides the students with basic knowledge on optometry, its disciplines, and its importance in enabling comprehensive ocular evaluation

2. The course introduces the various roles that optometrists can play in terms of clinical, community, academic and research services and how different courses in the curriculum enable them towards achieving this objective

TEXT BOOK: J. Boyd Eskridge, John F. Amos, Jimmy D. Bartlett, Clinical Procedures in Optometry

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COURSE PLAN:

Unit	Topic	Hours
1	Introduction to optometry, Definition, Rights and Responsibilities Integration of basic sciences and support courses to Optometry Role of optometry in comprehensive eye care.	10
2	Introduction to Primary eye care, Blindness, Vision impairment, Refractive errors, common ocular diseases like cataract, diabetic retinopathy, glaucoma Disciplines in Optometry: Binocular vision, Contact lens, Low vision care, Occupational optometry and Sports Optometry etc.	10
3	Background of the profession: Allied and Health care Profession, Systems and streams of different professions and the position of optometry Evolution of optometry in India Global practice trends of optometry What does it take to become a healthcare professional?	10

NUTRITION

CL	CP	L	P
1	0	15	0

INSTRUCTOR IN CHARGE: Nutritionist with Masters/ Doctorate

COURSE DESCRIPTION: This course covers the basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and ocular disease, Nutrition and ocular aging, and contraindications, adverse reactions and ocular nutritional supplements.

OBJECTIVES: At the end of the course student would have gained the knowledge of the following: Balanced diet. • Protein, carbohydrates, vitamins, Minerals, carotenoids and eye. • Nutrition and Ocular aging • Adverse effects of ocular nutritional supplements.

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TEXT BOOK:

1. Textbook on nutrition and dietetics - Clement I 1st edition.

REFERENCE BOOKS:

1. M Swaminathan: Hand book of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore, 2004

2. C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad,2004

PREREQUISITES: Nil

COURSE PLAN

Unit	Topic	Hours
1	Introduction: Food groups, RDA, Balanced diet, diet planning. Assessment of nutritional status. Energy: Units of energy, Measurements of energy and value of food, Energy expenditure. Total energy/calorie requirement for different age groups and diseases. Satiety value, Energy imbalance- obesity, starvation. Limitations of the daily food guide. Nutrients and Nutrient derivatives relevant to ocular health: Proteins, Lipids, carbohydrates, vitamins, minerals and trace elements, carotenoids, oxidative stress and the eye.	5
2	Nutrition deficiency and ocular disease: Vitamin A deficiency, Vitamin C deficiency and ocular disease, Vitamin E deficiency, retinitis pigmentosa.	5
3	Nutrition and Ocular Senescence: Nutrition and malnutrition in older people, Dry eye disorders, Glaucoma, Cataract, and Age-related macular degeneration. Contraindications, adverse reactions and ocular nutritional supplements. Recent Advance in research into nutrition related eye health: Age related eye disease study (AREDS), Carotenoids in Age related eye disease study (CAREDS),	5

COMMUNICATION

CL	CP	L	P
1	2	15	60

INSTRUCTOR IN CHARGE PhD/ Masters in the field of communication preferable.

COURSE DESCRIPTION: This course deals with essential functional English aspects and nuances of the communication skills essential for the health care professionals.

OBJECTIVES:

1. This course trains the students in oral presentations, expository writing, logical organization and structural support.

2. By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

TEXT BOOK:

1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.

2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009

REFERENCE BOOKS: Faculty may decide.

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PREREQUISITES: Basic English-speaking writing comprehension skills

COURSE PLAN

Unit	Topics	Hours
1	Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words, Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms. Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension, Summary writing, Creative writing, newspaper reading. Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good delivery, Audience psychology, handling	5
2	Communication process, Elements of communication, Barriers of communication and how to overcome them. Nuances for communicating with patients and their attenders in hospitals.	5
3	Listening Process, Barriers to Listening, Types of Listening, Importance of listening, Good and persuasive listening, Characteristics of a good listener. Efficient and fast reading, Awareness of existing reading habits, Tested techniques for improving speed, Improving concentration and comprehension through systematic study. Basics of non-verbal communication , Rapport building skills using neuro- linguistic programming (NLP)	5

PRACTICALS

- Listening comprehension
- Listening and Note-taking
- Training in Listening
- Professional speaking
- Audience Analysis
- Organizing a speech
- Delivering a speech: Presentation Strategies
- Interview Techniques
- Group Discussion
- Professional writing
- Trans-coding -- from verbal to visual & from visual to verbal
- Editing, Proof reading, Referencing

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- Proposals
- User manual and Product description
- Reports – feasibility, market survey, project
- Conference paper/journal article writing in IMRAD Format
- Memos and E-mails
- Advertisement Writing
- Scenarios in Optometric Practice (Role play)
- As Clinician
- As Patient
- As Parent/ attendant
- Non-verbal communication

CL	CP	L	P
0	1	0	30

CLINICAL OPTOMETRY I

INSTRUCTOR IN CHARGE: M Optom with experience in teaching basic or core optometry courses

COURSE DESCRIPTION: This course deals with introducing the students to the optometric clinical rotations in a clinic or a hospital.

OBJECTIVES:

The objective is to introduce the student to the working of a clinic/ hospital

To introduce different departments in a hospital/ non-optometry services in a clinic

TEXT BOOK: Faculty to decide

REFERENCE BOOKS: Relevant Hospital Administrative Manuals (Faculty may decide)

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COURSE PLAN

Practicals:

1. Observe the basic operations of the optometry clinic while interacting with the team members involved in providing optimal care to patients.

2. Setting up of an optometric work up room

3. Introduction to relevant terminologies, equipment and techniques used for treatment.

4. Tour the hospital and get to know other departments in a tertiary eye care hospital and provide a report on the observation

5. Coverage on the process of the clinic/ hospital, creating and maintaining medical records (electronic),

6. Processes and guidelines in the Human resources department during the studentship along with the roles and responsibilities of the students,

7. Observation in clinical and non-clinical processes of the Optometry/ Opticals Department. Depending on the availability of the other departments like Disposals of the medical and non- medical waste in the system, Department of Bioengineering, Patient services, eye banks, multimedia/ Web development etc observations can be encouraged.

8. Basic Life Support Skills Training

9. Observation at the Hospital infection control and Safety and the Quality Control System

10. Training on basic clinical protocol for community outreach

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Second Semester

CL	CP	L	P
3	0	45	0

GENERAL PHARMACOLOGY

INSTRUCTOR INCHARGE: MD Pharmacology/M.Pharm or Pharm D who have adequate experience in teaching pharmacology.

COURSE DESCRIPTION: This course covers the actions, uses, adverse effects and mode of administration of drugs.

OBJECTIVES: At the end of the course the students will acquire knowledge in the following aspects-

1. Basic principle of pharmacokinetics & Pharmacodynamics
2. Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

TEXT BOOK/REFERENCE BOOKS:

3. 1.Essentials of medical pharmacology - K D Tripathi 8th edition
4. 2. Ocular Therapeutics Handbook by Dr. Bruce E. Onofrey

PREREQUISITES: General Physiology & Biochemistry

COURSE PLAN

Unit	Topics	Hours
1	General Pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factors modifying drug actions	15
2	Systemic Pharmacology: Autonomic nervous system, Cardiovascular system: Anti-hypertensive and drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, Depressants. Histamines and Anti histamines, Serotonin, Prostaglandin	10

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3	General & local anaesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants	10
4	Principles and classification of autonomic drugs, Sympathomimetics – Sympatholytics, Parasympathomimetics – Parasympatholytics, Diagnostic use of autonomic drugs, Sulfonamides, Antibiotics, Anaesthetics-Proteolytic enzymes	10

GENERAL PATHOLOGY

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: MD Pathology.

COURSE DESCRIPTION: This course describes basic aspects of disease processes with reference to specific entities relevant in optometry/ophthalmology.

OBJECTIVES At the end of the course students will acquire knowledge in the following aspects:

1. Inflammation and repair aspects.
2. Pathology of various eye parts and adnexa.

TEXT BOOK

1. Textbook of pathology - Harsh Mohan 8th edition

REFERENCE BOOKS:

1. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.

2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

PREREQUISITES: Higher Secondary Biology, General and Ocular Anatomy, General and Ocular Physiology

COURSE PLAN

Unit	Topics	Hours
1	Modes of cell injury, Necrosis & gangrene, Inflammation and repair (Chronic and Acute), Infection in general, Specific infections: Tuberculosis, Leprosy, Syphilis, Fungal infection, Viral, chlamydial infection	15
2	Neoplasia, Haematology, Anemia, Leukemia, Bleeding disorders. Circulatory disturbances: Thrombosis, Infarction, Embolism, Hypersensitivity reactions	10
3	Clinical pathology: Immune system, Shock, Anaphylaxis, Allergy	5

OCULAR AND RELATED NEURO-ANATOMY

CL	CP	L	P
3	0.5	45	15

INSTRUCTOR IN CHARGE: M Optom who have adequate experience in teaching anatomy or MD (Anatomy) or M.Sc (Anatomy).

COURSE DESCRIPTION: This course deals with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions.

OBJECTIVES: At the end of the course, the student should be able to:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa.

2. Identify the microscopic structures of various tissues in the eye and correlate the structure with the functions.

3. Comprehend the basic structure and connections between the various parts of the central nervous system and the eye so as to understand the neural connections and distribution.

4. To understand the basic principles of ocular embryology.

TEXT BOOK: Anatomy and Physiology of Eye, Second edition, By: AK Khurana, Indu Khurana: CBS Publishers, New Delhi, 2006

PREREQUISITES: General anatomy

COURSE PLAN

Unit	Topics	Hours
1	Ocular Embryology. Ocular Structures: Eyeball, Visual pathway, orbit, extraocular muscles and appendages. Ocular Embryology. Eyebrows: Gross anatomy, structure, vessels and nerves, functions. Orbit: Bony orbit, periorbita, orbital fascia, surgical spaces in the orbit, orbital fat and reticular tissue, apertures at the base of orbit, contents of the orbit; Paranasal sinuses. Anatomy of eyelids: Gross, structure, Glands of eyelids, vessels and nerves. Extraocular muscles: rectus, oblique, nerve supply, blood supply.	9
2	Conjunctiva: Parts of conjunctiva, Structure of conjunctiva, the conjunctival glands, Plica semilunaris, the caruncle, Blood supply of the conjunctiva, venous drainage of conjunctiva, lymphatics of the conjunctiva, nerve supply of conjunctiva. Cornea: Dimensions, histology, blood supply, nerve supply, Limbus: Anatomical limbus, surgical limbus, cataract incision; Sclera: Thickness of sclera, special regions of the sclera, scleral apertures, microscopic structure, nerve supply, Uvea : iris, ciliary body choroid, blood supply; Aqueous Humour: Ciliary body, posterior chamber, anterior chamber, angle of the anterior chamber, Gonioscopic grading of the angle, Aqueous outflow system	9
3	The crystalline lens: structure of the lens, ciliary zonules. Vitreous Humour: general features, Structure (Hyaloid membrane, cortical vitreous, medullary vitreous), attachments, vitreous base. Retina and Visual Pathway : Gross anatomy of retina, microscopic structure, blood-supply of retina, blood retinal barrier; Anatomy of different components of visual pathway, arrangement of nerve fibres, blood supply, lesions of visual pathway.	9

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4	Lacrimal apparatus: Lacrimal glands (main and accessory; structure, blood supply, lymphatic drainage, nerve supply), Lacrimal passages (Puncta, canaliculi, lacrimal sac, nasolacrimal duct, blood supply, nerve supply). Tear film: Functions, structure (all layers), Physical properties, Chemical composition (water, proteins, metabolites, electrolytes, and lipids). Blood vessels and ocular circulations: Blood vessels – arteries and venous drainage; Ocular circulation – structural characteristics of ocular vessels. Orbital Nerves: Oculomotor, trochlear, abducent, trigeminal, facial, autonomic nerves	9
5	Central nervous system: Spinal cord and brain stem, Cerebellum, Cerebrum. Nervous system: Neuron –Conduction of impulse –synapse –receptor, Sensory organization –pathways and perception, Reflexes – cerebral cortex –functions. Thalamus –Basal ganglia, Cerebellum, Hypothalamus, Autonomic nervous system –motor control of movements, posture and equilibrium , Conditioned reflex, eye hand co-ordination	9

PRACTICAL (15 Hours)

1. Practical demonstration of bovine eye dissection.
2. Retina Layers - Video Demonstration and OCT
3. Cranial Nerve Examination
4. Meibomian glands using meibography
5. Syringing to understand lacrimal apparatus

OCULAR AND RELATED NEUROPHYSIOLOGY

CL	CP	L	P
3	1	45	30

INSTRUCTOR IN CHARGE: M Optom with experience in teaching ocular and neurophysiology or MD Physiology, M. Sc (Physiology)

COURSE DESCRIPTION: Ocular physiology deals with the physiological and neurological functions of each part of the eye.

OBJECTIVES: At the end of the course, the student should be able to:

1. Explain the normal functioning of all structures of the eye and their interactions
2. Elucidate the physiological aspects of normal growth and development of the eye
3. Understand the phenomenon of vision
4. List the physiological principles underlying pathogenesis and treatment of diseases of the eye

TEXT BOOK:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006

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

REFERENCE BOOKS:

1. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

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PREREQUISITES: General Physiology

COURSE PLAN:

Unit	Topics	Hours
1	Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe , Extrinsic eye muscles, their actions and control of their movements, Coats of the eye ball, Ocular, movements and saccades	9
2	Cornea, Aqueous humor and vitreous: Intra ocular pressure, Iris and pupil, Crystalline lens and accommodation – presbyopia, Mechanism of accommodation, Retina – structure and functions	9
3	Vision – general aspects of sensation, Pigments of the eye and photochemistry, The visual stimulus, refractive errors, Visual acuity, Vernier acuity and principle of measurement, Visual perception – Binocular vision, stereoscopic vision, optical illusions	9
4	Visual pathway, central and cerebral connections, Introduction to electro physiology, Retinal sensitivity and Visibility, Receptive stimulation and flicker	9
5	Colour vision and colour defects. Theories and diagnostic tests, Scotopic and Photopic vision, Color vision, Color mixing, Visual perception and adaptation, Introduction to visual psychology (Psychophysics)	9

PRACTICALS (30 Hours)

1. Examination of Lid movements and Extra ocular movements
2. Tests for lacrimation
3. Experiments on Binocular vision(Accommodation, Vergence, Disparity, Single Vision, Fusion & Stereopsis)
4. Examination of Pupillary reflexes
5. Experiments on Light and dark adaptation
6. Experiments on Colour Vision

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OCULAR BIOCHEMISTRY

CL	CP	L	P
3	1	45	30

INSTRUCTOR IN CHARGE: M Optom with experience in teaching Biochemistry or Masters or PhD in Biochemistry

COURSE DESCRIPTION: Ocular Biochemistry deals with the metabolism that takes place in the human body. It also deals with ocular biochemistry in detail. Clinical estimation as well as the clinical significance of biochemical values is also taught.

OBJECTIVES: At the end of the course, the student should be able to demonstrate his knowledge and understanding on

1. Structure ,function and interrelationship of biomolecules and consequences of deviation from the normal
2. Integration of various aspects of metabolism and their regulatory pathways
3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data
4. Understand metabolic processes taking place in different ocular structures.

TEXT BOOK: S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990

2. D R Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

PREREQUISITES: Higher secondary level chemistry with good knowledge of organic chemistry and knowledge of Basic Biochemistry

COURSE PLAN:

Unit	Topics	Hours
1	Importance of ocular biochemistry in ophthalmic practice; Tear film – Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy, Cornea – Biochemical composition of cornea. Sources of Nutrients-Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt	9
2	Lens – Biochemical composition of lens. Lens protein – their types & characteristics. Lens Metabolism - Carbohydrate metabolism, protein metabolism. Cataract – Due to biochemical defects of lens. Antioxidant mechanism in the lens	9
3	Retina – structure – composition – photoreceptor cell – metabolism and functions – phagocytosis; Retinal neurochemistry – Monoamines – acetylcholine – GABA – amino acids – taurine – neuropeptides – Biochemical correlates of retinal diseases	9
4	Biochemistry of the visual process; Photopigments – Rhodopsin & Iodopsin. Chemical nature of Rhodopsin. Visual cycle (Bleaching of Rhodopsin, Transducin cycle, Role of Phosphodiesterases)	9
5	Technique: Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry. Radio isotopes: application in medicine and basic research.	9

PRACTICAL (30 Hours)

- Quantitative and qualitative analysis by spectrophotometry
- Electrophoresis
    - Chromatography – Lysozyme, Lactoferin, IgA etc
- Preparation of normal, molar and percentage solutions – matching Tear Osmolarity.

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- Measurement of tear osmolarity
    - Preparation of buffers, pH determination
- pH estimation of tears.
- Biochemistry Assay using following specimens
    - Tears of different age groups
    - Cataract lens
    - Different types of used contact lenses
    - Contact lens solutions on tears
    - Demonstration of various techniques as given in unit 5.

GEOMETRICAL OPTICS II

CL	CP	L	P
3	1	45	30

INSTRUCTOR IN CHARGE: A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR M Optom

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behavior as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

1. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.

2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.

2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

PREREQUISITES: Higher secondary level mathematics, physics, Geometric Optics I.

COURSE PLAN:

Unit	Topics	Hours
1	Vergence and vergence techniques revised. Gullstrand's schematic eyes, visual acuity, Stile Crawford. Emmetropia and ametropia	10
2	Blur retinal Imaginary, Correction of spherical ammetropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptoric power, angular magnification of spectacles in aphakic. Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.	15
3	Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification. Aperture stops- entrance and exit pupils. Aberrations Spherical – Coma - Oblique astigmatism - Curvature of the field – Distortion - Chromatic (longitudinal and lateral) - higher order aberrations.	10
4	Telescopes and Microscopes, Accommodation – Accommodation formulae and calculations. angular magnification of spectacle lens, near point, calculation of add, depth of field.	10

PRACTICAL (30 Hours)

1. Image formation with Cylindrical Lenses, Imaging by two cylinders in contact –
2. Image formation with spherocylindrical lens – sphere and cylinder in contact
3. Calculation of Spectacle and Relative Spectacle Magnification
4. Construction of a tabletop telescope – all three types of telescopes.
5. Construction of a tabletop microscope
6. Demonstration of Aberrations

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BASICS OF COMPUTERS

CL	CP	L	P
0	1	0	30

INSTRUCTOR IN CHARGE: M Optom with adequate computer knowledge and with teaching experience or Graduate in Information and technology

COURSE DESCRIPTION: The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

OBJECTIVES: The students will be able to appreciate the role of computer technology and some extent able to gain hand-on experience in using computers.

TEXTBOOK: Faculty can decide

COURSE PLAN:

1. Introduction to computer: Input and output devices: Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices, Introduction of windows, Introduction of Operating System
2. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
3. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
4. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
5. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), Internet and its Applications.
6. Introduction to computer applications in health and hospital data management system

CL	CP	L	P
0	2	0	60

CLINICAL OPTOMETRY II

Students will observe the basic operations of the optometry clinic while interacting with the multidisciplinary team members involved in providing optimal care to patients. The student will be introduced to optical terminology, equipment, and techniques used for treatment.

Students will maintain a log of all the cases seen in the outpatient department. Students will be given hands on training on basic optometry procedures such as history taking, vision testing, basic binocular vision testing and other ancillary procedures that are part of a comprehensive eye examination.

COURSE PLAN:

1. History Taking in systemic conditions and its relevant ocular implications
2. General medications and its systemic conditions
3. Interpretation of lab reports: Blood reports, urine reports, endocrinology reports
4. Estimation of random blood sugar
5. Estimation of Blood Pressure and pulse rate
6. Demonstration of CPR
7. Clinical Assessment of cranial nerve functions
8. Visual Acuity tests for adult and children
9. Basic Binocular Vision tests
10. Tear film and lid assessment

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GENERAL AND OCULAR MICROBIOLOGY

CL	CP	L	P
3	0.5	45	30

INSTRUCTOR IN CHARGE: Microbiologist with Masters or Ph D qualification.

COURSE DESCRIPTION This course covers the basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

OBJECTIVES The objectives of the course are:

1. To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites;
2. To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice;
3. To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and
4. To understand basic principles of diagnostic ocular Microbiology.

TEXT BOOK:

Textbook of microbiology - Ananthanarayan and Paniker 11th edition

REFERENCE BOOKS:

1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology
2. SYDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM)

PREREQUISITES: Higher secondary Biology

COURSE PLAN:

Unit	Topics	Hours
1	Introduction to Microbiology: History and scope of Medical Microbiology; Prokaryotic Cell structure and functions; Eukaryotic Cell structure and functions; Overview of Bacteriology, Mycology, Virology and Protozoology; Ocular microbiology - Normal ocular flora; Control of Microbial Growth - Antimicrobial methods and Chemotherapy; Basic Laboratory techniques.	9
2	Sterilization in ophthalmic practice: Heat (dry & wet heat – steam under pressure autoclaving), radiation, filter, chemicals; control of efficacy of sterilization. Disinfection procedure - glutaraldehyde (2%), chlorhexidine, alcohol, iodine; preventive methods – hand washing, needle stick/slash policy; methods to disinfect tonometer and Slit lamp biomicroscope; Preventative method in operation theatre – attire, caps & masks, hand washing, cleaning procedure.	9
3	Ocular Immunology: Innate and adaptive immunity; Hypersensitivity responses - Anaphylactic hypersensitivity, cytotoxic hypersensitivity, Complex-mediated hypersensitivity, Delayed hypersensitivity; Autoimmunity; Host parasite relationship.	9
4	Ocular Bacteriology: Ocular Bacterial diseases, Pathological mechanisms, Immunity, Laboratory diagnosis Ocular Mycology: Ocular Mycotic diseases, Laboratory diagnosis Ocular Virology: Ocular Viral infections, Immunity, Laboratory diagnosis; Ocular Parasitology: Acanthameba, Toxoplasma, Onchocerciasis, Toxocariasis, Cysticercus cellulosae (larval form of Taenia solium), Phthiriasis	9

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5	Hospital borne ocular infections: postoperative endophthalmitis, conjunctivitis, infections transmitted through corneal transplantations, hepatitis, HIV; high risk areas and staff; preventive methods, AIDS protocol, infective waste disposal	9

PRACTICALS:

1) Sterilization & Disinfection procedures and quality control

2) Collection of specimens from conjunctiva, lid margin (using sterile cotton swabs), Specimen processing

3) Isolation & Purification of microbes from collected specimens

4) Characteristic growth on different culture media

5) Characterization & Identification

· Staining – Gram staining, Acid fast staining, Spore Staining, Flagella staining

· Motility – Hanging drop method

· Biochemical tests

· Antibiotic sensitivity test

6) Isolation and identification of various fungal strains in the laboratory

7) Video demonstration of collection of specimen from cornea intraocular specimens (Aqueous humor and Vitreous aspirate) processing and reporting on bacterial and fungal cultures and reporting.

8) Lab tour/ orientation to the PCR facility in diagnosis of ocular infections

9) Impression Cytology of conjunctiva

OCULAR PHARMACOLOGY

CL	CP	L	P
3	0	45	0

INSTRUCTOR INCHARGE: M Optom or MD Pharmacology or MS Ophthalmology with experience in teaching Phramacology

COURSE DESCRIPTION: This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.

OBJECTIVES: At the end of the course the students will acquire knowledge in the following aspects-

1. Basic principle of pharmacokinetics & Pharmacodynamics

2. Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

TEXT BOOK/REFERENCE BOOKS:

1. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996

2. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

PREREQUISITES: General Physiology & Biochemistry

COURSE PLAN:

Unit	Topic	Hours
1	Ocular Pharmacology: Ocular preparations, formulations and requirements of an ideal agent. Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology	9
2	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedures, Anti-glaucoma drugs	9
3	Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial infections	9
4	Pharmacotherapy of Drugs used in allergic, inflammatory & degenerative conditions of the eye	9
5	Pharmacotherapy of Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants	9

VISUAL OPTICS I

CL	CP	L	P
3	1	45	30

INSTRUCTOR IN CHARGE: M Optom with teaching experience in optics.

COURSE DESCRIPTION: This course deals with the concept of eye as an optical instrument and thereby covers various optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

OBJECTIVES: Upon completion of the course, the student should be able:

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.

TEXT BOOK:

1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998
3. T Grosvenor: Primary Care Optometry,4th edition, Butterworth – heinneman,USA,2002

REFERENCE BOOKS:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
4. WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

PREREQUISITES: Geometrical optics, Physical optics, Ocular Physiology

COURSE PLAN

Unit	Topic	Hours
1	Review of Geometrical Optics: Vergence and power. Conjugacy, object space and image space, Sign convention, Spherical refracting surface, Spherical mirror; catoptric power, Cardinal points, Magnification, Light and visual function, Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Bi-refringence, Dichroism. Aberration and its application Spherical and Chromatic aberration	**10**
2	Optics of Ocular Structure: Cornea and aqueous, Crystalline lens, Vitreous, Schematic and reduced eye	**10**
3	Measurements of Optical Constants of the Eye, Corneal curvature and thickness, Keratometry, Curvature of the lens and ophthalmophakometry Axial and axis of the eye, Basic Aspects of Vision. Visual Acuity, Light and Dark Adaptation, Color Vision, Spatial and Temporal Resolution, Science of Measuring visual performance and application to Clinical Optometry	**10**
4	Refractive anomalies and their causes, Etiology of refractive anomalies Contributing variability and their ranges, Populating distributions of anomalies. Optical component measurements. Growth of the eye in relation to refractive errors	**15**

PRACTICAL (30 HOURS)

1. Study of Purkinje images I to IV.
2. Measurement of corneal curvature.
3. Measurement of corneal thickness.
4. Mathematical models of the eye - emmetropia, Hyperopia, Myopia
5. Conjugate points - demonstration - worked examples.
6. Axial and refractive ametropia - hyperopia, myopia - worked examples.
7. Construction of Visual acuity charts

8. Effect of lenses in front of the eye
9. Effect of prisms in front of the eye
10. Vision through pinhole, slit, filters, etc.

CL	CP	L	P
3	1	45	30

OPTOMETRIC OPTICS

INSTRUCTOR IN CHARGE: M Optom with teaching experience in Optics

COURSE DESCRIPTION: This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect.

OBJECTIVES: Skills/knowledge to be acquired at the end of this course: -

1. Measurement of lens power , lens centration using conventional techniques
2. Transposition of various types of lenses Knowledge to identify different forms of lenses (equi- convex, plano convex, periscopic, etc.)
3. Ophthalmic prism knowledge –effects, units, base-apex notation, compounding and resolving prisms.
4. Knowledge lens designs –single vision, bifocals, progressive lens
5. Knowledge on tinted and protective lenses

TEXT BOOK: Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.

REFERENCE BOOKS:

1. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission,1999

2. C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996

PREREQUISITES: Physical Optics, Geometrical Optics

COURSE PLAN

Unit	Topics	Hours
1	Introduction –Light, Mirror, Reflection, Refraction and Absorption. Lenses –Definition, units, terminology used to describe, form of lenses Vertex distance and vertex power, Effectivity calculations	9
2	Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical Transpositions –Simple, Toric and Spherical equivalent, Surfacing of spherical and cylindrical lenses	9
3	Spherometer & Sag formula, Edge thickness calculations, Manufacturing of lenses, Inspection of Lenses	9
4	Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms. Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinder lenses	9
5	Lens Designs: Single Vision, Bifocals and Multifocal Lenses. Tints and Protective Lenses, Special design lenses, Aberration in Ophthalmic Lenses	9

PRACTICAL (30 HOURS)

1. Lens curvature and refractive index calculation with lens gauge, Lens material, design selection
2. Lensometry (Single vision, Bifocal and Progressives, prism spectacles)
3. Identification of lens defects
4. Identification of tints, safety eyewear, and special lenses
5. Demonstration of newer design lenses
6. Visit to manufacturing lab set up to demonstrate surfacing of lenses.

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OCULAR DISEASES I

CL	CP	L	P
3	0	45	0

INSTRUCTOR IN CHARGE: MS Ophthalmology or M Optom/PhD in Optometry with experience in teaching ocular diseases

COURSE DESCRIPTION: This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases:

1. Etiology
2. Epidemiology
3. Symptoms
4. Signs
5. Course sequelae of ocular disease
6. Diagnostic approach and
7. Management of ocular diseases.

TEXT BOOK: Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

REFERENCE BOOKS:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

2. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990

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PREREQUISITES: Ocular anatomy and Ocular Physiology, Ocular Biochemistry and Microbiology, Pharmacology

COURSE PLAN

Unit	Topics	Hours
1	Orbit Applied Anatomy, Proptosis (Classification, Causes, Investigations) Enophthalmos, Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome) Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis) Grave's Ophthalmopathy, Orbital tumors(Dermoids, capillary haemangioma, Optic nerve glioma), Orbital blowout fractures, Orbital surgery (Orbitotomy), Orbital trauma , Approach to a patient with proptosis	7
2	Lids Applied Anatomy, Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos) Oedema of the eyelids(Inflammatory, Solid, Passive edema) Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion ,Interalhordeolum, Molluscum Contagiosum) Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis). Tumors (Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)	6
3	Lacrimal System : Applied Anatomy, Tear Film, The Dry Eye (Sjogren's Syndrome), The watering eye (Etiology, clinical evaluation), Dacryocystitis, Swelling of the Lacrimal gland(Dacryoadenitis)	6
4	Conjunctiva Applied Anatomy, Inflammations of conjunctiva (Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis) Degenerative conditions(Pinguecula, Pterygium, Concretions) Symptomatic conditions(Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration), Cysts and Tumors	8

5	Cornea Applied Anatomy and Physiology, Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea), Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative. Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic) Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration) Dystrophies (Reis Buckler dystrophy,Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy) Keratoconus, Keratoglobus, Corneal oedema, Corneal opacity, Corneal vascularisation, Penetrating Keratoplasty	10
6	Uveal Tract and Sclera Applied Anatomy, Classification of uveitis, Etiology, Pathology, Anterior Uveitis, Posterior Uveitis, Purulent Uveitis, Endophthalmitis, Panophthalmitis, Pars Planitis, Tumors of uveal tract(Melanoma), Episcleritis and scleritis, Clinical examination of Uveitis and Scleritis	8

INDIAN MEDICINE AND TELEMEDICINE

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: Public health professional or M Optom who have knowledge in National health care system.

COURSE DESCRIPTION: This course insight into existing healthcare system in India.

OBJECTIVES: At the end of the course student will be aware of the traditional and the latest healthcare system. The student also will get basic knowledge about the telemedicine practices in India especially in eye care.

TEXT BOOK: Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014 (page 167 -178)

REFERENCE BOOKS: Faculty may decide.

COURSE PLAN:

Unit	Topics	Hours
1	Introduction to healthcare delivery system Healthcare delivery system in India at primary, secondary and tertiary care Community participation in healthcare delivery system Health system in developed countries. Private Sector National Health Mission National Health Policy Issues in Health Care Delivery System in India	8
2	National Health Programme-Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.	8
3	Introduction to AYUSH system of medicine 1. Introduction to Ayurveda. 2. Yoga and Naturopathy 3. Unani 4. Siddha 5. Homeopathy Need for integration of various system of medicine	8
4	Health scenario of India- past, present and future Telemedicine: Structure, components, Dissemination and Impact	6

CLINICAL OPTOMETRY III

CL	CP	L	P
0	4	0	120

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a registered optometrist. Students are tested on intermediate clinical optometry skills. The practical aspects of the optometric optics (hand-on in optical), optometric instruments, clinical examination of visual system(Hands-on under supervision) and ocular diseases (Slides and case discussion) will be given to the students during their clinical training.

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COURSE PLAN

1. Evaluation of EOM, Cover test, Hirschberg Test
2. Measurement of NPA, NPC, Stereopsis
3. Pupillary evaluation
4. Tests for Colour vision
5. Procedure of Confrontation
6. Measurement of IPD
7. Lensometry
8. Keratometry
9. Placido disc
10. Ptosis evaluation
11. Proptosis evaluation
12. Anterior segment evaluation – Torch light and slit lamp evaluation
13. Photostress recovery test
14. Red saturation test

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Fourth Semester

OPTOMETRIC INSTRUMENTS

CL	CP	L	P
3	0.5	45	15

INSTRUCTOR IN CHARGE: M Optom with experience in teaching instrument course or Bioengineer with experience in teaching

COURSE DESCRIPTION: This course covers commonly used optometric instruments, its basic principle, description and usage in clinical practice.

OBJECTIVES: Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the instruments that are utilised for a comprehensive ocular examination

TEXT BOOK: David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

REFERENCE BOOKS:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002

2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

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PREREQUISITES: Geometrical optics

COURSE PLAN

Unit	Topics	Hours
1	Optotypes and MTF, Spatial Frequency Test charts standards. Choice of test charts Trial case lenses Refractor (phoropter) head units Optical considerations of refractor units	7
2	Trial frame design Near vision difficulties with units and trial frames Retinoscope – types available Adjustment of Retinoscopes- special features Objective optometers. Infrared optometer devices	7
3	Projection charts Illumination of the consulting room. Brightness acuity test Vision analyzer Pupilometer Potential Acuity Meter Abberometer	7
4	Ophthalmoscopes and related devices, Design of ophthalmoscopes – illumination, Design of ophthalmoscopes- viewing, Ophthalmoscope disc Filters for ophthalmoscopy, Indirect ophthalmoscope	6

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5	Lensometer Lens gauges or clock Slit lamp Tonometers	6
6	Keratometer and corneal topography Refractometer Orthoptic Instruments (Synaptophore Only) Color Vision Testing Devices	6
7	Fields of Vision And Screening Devices Scans Electrodiagnostics New Instruments	6

PRACTICALS

1. Visual Acuity chart/drum
2. Retinoscope
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Biomicroscope
7. Slit lamp Ophthalmoscopy (+90, 78 D)
8. Gonioscope
9. Tonometer: Applanation Tonometer
10. Keratometer
11. Perimeter
12. Electrodiagnostic instrument (ERG, VEP, EOG)
13. A –Scan Ultrasound
14. Lensometer

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CLINICAL EXAMINATION OF THE VISUAL SYSTEM

CL	CP	L	P
1	2	15	60

INSTRUCTOR IN CHARGE: M.Optom in Optometry with relevant experience in teaching

COURSE DESCRIPTION: This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuroophthalmic examination, paediatric optometry examination, and Glaucoma evaluation.

OBJECTIVES: At the end of the course the students will be skilled in knowing the purpose, set-up and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures

TEXT BOOK: T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinneman, USA, 2007.

REFERENCE BOOKS:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007

2. D B. Elliott: Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007

3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth-Heinemann, 2007

4. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991

5. N B. Carlson, Dl Kurtz: Clinical Procedures for Ocular Examination ,3rd edition, McGraw-Hill Medical, 2003

PREREQUISITES: Optometric Instruments, Visual optics

COURSE PLAN

Unit	Topics	Hours
1	History taking, Visual acuity estimation, Extraocular motility, Cover teat, Alternating cover test, Hirschberg test, Modified Krimsky, Maddox Rod, Saccades and pursuit test	5
2	Pupils Examination, Color Vision, Stereopsis, Confrontation test, Photostress test, Amsler test, Contrast sensitivity function test	5
3	External examination of the eye, Slit lamp biomicroscopy, Van Herrick, Tonometry, ROPLAS, Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer), Ophthalmoscopy	5

PRACTICALS

1. History taking
2. Visual acuity estimation
3. Extraocular motility, Cover teat, Alternating cover test
4. Hirschberg test, Modified Krimsky
5. Pupils Examination
6. Maddox Rod
7. Van Herrick
8. External examination of the eye, Lid Eversion
9. Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),
10. Color Vision
11. Stereopsis
12. Confrontation test
13. Photostress test
14. Slit lamp biomicroscopy
15. Ophthalmoscopy

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16. Tonometry
17. ROPLAS
18. Amsler test
19. Contrast sensitivity function test
20. Saccades and pursuit test

VISUAL PERCEPTION AND PSYCHOPHYSICS

CL	CP	L	P
2	0.5	30	15

INSTRUCTOR IN CHARGE: M Optom or PhD in Optometry and/or Vision Science with experience in psychophysics

COURSE DESCRIPTION: The course covers the entire pathway of visual perception from image formation to brain resolving of images. The course covers various domains of visual perception including Spatial, Temporal, Depth, Motion and colour vision

OBJECTIVES:

The course aims to provide the leaners with a clear understanding of the processes involved in the perception of various domain of vision. Specifically, the leaners will study about the various processes in the visual system to analyze the image that is formed on the retina.

TEXTBOOK and REFERENCE BOOK: S. H. Schwartz, *Visual Perception – A Clinical Orientation*, 5/e, McGraw-Hill Medical Publishing Division, New York, USA, 2017

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PREREQUISITES: Visual Optics -1, Neuro Physiology of vision

COURSE PLAN

Unit	Topics	Hours
1	Visual Physiology: Processing of light at each layer of retina, Types of Bipolar cells, ganglion cells, Receptive fields, Post retinal visual pathways in terms of visual processing, Duplex retina – Scotopic and photopic visual system, absolute sensitivity of vision, parallel pathways - parvo and magnoretinogeniculate pathway, postnatal human vision development	7
2	Introduction to Psychophysics: Weber's Law and Fechner's Law, Classical concepts of thresholds, Modern concepts of thresholds – statistical nature of thresholds; internal and external noise; factors affecting thresholds, Psychophysical methods of threshold estimations – methods of limits, staircase and adaptive techniques of threshold estimation, forced-choice procedures	8
3	Spatial & temporal aspects of vision: Basic concepts of photometry and radiometry, v Lambda function/ Luminance/ Illuminance, Modulation transfer function (MTF), contrast sensitivity function (CSF), Effect of optical and neural disorders on the CSF, Spatial summation, Ricco's law, differences between acuity types, conversion of visual acuity to grating acuity, Nyquist limit, Temporal procession of vision, Critical flicker frequency (CFF), temporal summation, Bloch's law, Motion perception, Depth perception – monocular and binocular depth cues	8
4	Color vision: Rod and Cone Spectral Sensitivity Function, Theories of colour vision – trichromatic theory and colour opponent theory, visual processing involved in color perception, clinical testing of color vision and principles	7

PRACTICALS

1. Determination of blur threshold
2. Visual acuity testing
3. Colour vision examination

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VISUAL OPTICS II

CL	CP	L	P
3	1	45	30

INSTRUCTOR INCHARGE: M.Optom with relevant experience in teaching optics

COURSE DESCRIPTION: This course deals with the concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

OBJECTIVES: Upon completion of the course, the student should be able:

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.

TEXT BOOK/REFERENCE BOOKS:

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, 2007
2. Duke –Elder's practice of Refraction
3. AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006
4. George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002
5. Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth – Heinemann, 2002
6. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann, 2007
7. WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

PREREQUISITES: Geometrical Optics, Physical Optics & Ocular Physiology, Visual optics -I

COURSE PLAN

Unit	Topics	Hours
1	Accommodation & Presbyopia, Far and near point of accommodation, Range and amplitude of accommodation, Mechanism of accommodation, Variation of accommodation with age, Anomalies of accommodation, Presbyopia, Hypermetropia and accommodation	9
2	Convergence: Type, Measurement and Anomalies Relationship between accommodation and convergence-AC/A ratio	9
3	Objective Refraction (Static & Dynamic), Streak retinoscopy, Principle, Procedure, Difficulties and interpretation of findings, Transposition and spherical equivalent, Dynamic retinoscopy various methods Radical retinoscopy and near retinoscopy, Cycloplegic refraction	9
4	Subjective Refraction: Principle and fogging, Fixed astigmatic dial(Clock dial),Combination of fixed and rotator dial(Fan and block test),J.C.C Duochrome test, Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging, Binocular refraction-Various techniques, Prescribing guidelines, Understanding Myopia: Theories, definitions, myopia management, recent advancements	9
5	Effective Power & Magnification : Ocular refraction vs. Spectacle refraction Spectacle magnification vs. Relative spectacle magnification, Axial vs. Refractive Ametropia, Knapp's law, Ocular accommodation vs. Spectacle accommodation, Retinal image blur-Depth of focus and depth of field	9

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PRACTICALS:

1. Visual acuity, stereo acuity in emmetropia.
2. Myopia and pseudomyopia, myopia and visual acuity
3. Myopic correction - subjective verification - monocular and binocular
4. Hypermetropia - determination of manifest error subjectively.
5. Hypermetropic correction: subjective verification
6. Demonstration of astigmatism.
7. Use of slit and Keratometry to find the principle meridians.
8. Astigmatism: Fan - subjective verification tests
9. Astigmatism: Cross-Cyl. - subjective verification tests.
10. Measurement of accommodation: near and far points and range.
11. Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid test.
12. Methods of differentiating axial and refractive ametropia
13. Practice of Retinoscopy
14. Interpretation of cycloplegic retinoscopic findings.
15. Prescription writing.
16. Binocular refraction.
17. Photo refraction.

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OCULAR DISEASE II

CL	CP	L	P
3	0	45	0

INSTRUCTOR INCHARGE: MS Ophthalmology or M Optom

COURSE DESCRIPTION: This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: knowledge on Etiology, Epidemiology, Symptoms, Signs, Course sequelae of ocular disease

1. Diagnostic approach, and
2. Management of the ocular diseases.

TEXT BOOK: A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

REFERENCE BOOKS:

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990

2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007

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PREREQUISITES: Ocular anatomy and Ocular Physiology, Ocular Biochemistry and Microbiology, Ocular Disease - I

COURSE PLAN

Unit	Topics	Hours
1	Retina and Vitreous: Applied Anatomy, Congenital and Developmental disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery) Inflammatory disorders (Retinitis : Acute purulent , Bacterial, Virus, mycotic) Retinal Vasculitis (Eales's) Retinal Artery Occlusion (Central retinal Artery occlusion) Retinal Vein occlusion (Ischaemic, Non Ischaemic, Branch retinal vein occlusion) Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration. Retinal Detachment: Rhegmatogenous, Tractional, Exudative) Retinablastoma Diabetic retinopathy	9
2	Ocular Injuries: Terminology : Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury) Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis) Non Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational) Clinical approach towards ocular injury patients	9

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3	Lens Applied Anatomy and Physiology, Clinical examination, Classification of cataract Congenital and Developmental cataract, Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic) Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar. Management of cataract (Non-surgical and surgical measures; preoperative evaluation, Types of surgeries,) Complications of cataract surgery Displacement of lens: Subluxation, Displacement, Lens coloboma, Lenticonus, Microspherophakia.	9
4	Clinical Neuro-ophthalmology Anatomy of visual pathway, Lesions of the visual pathway Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robetson pupil, Adie's tonic pupil) Optic neuritis, Anterior Ischemic optic neuropathy, Pappilloedema, optic atrophy Cortical blindness Malingering Nystagmus, Clinical examination	9
5	Glaucoma Applied anatomy and physiology of anterior segment, Clinical Examination Definitions and classification of glaucoma, Pathogenesis of glaucomatous ocular damage, Congenital glaucoma, Primary open angle glaucoma Ocular hypertension, Normal Tension Glaucoma, Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) Secondary Glaucoma Management : common medications, laser intervention and surgical techniques	9

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BEHAVIORAL HEALTH PSYCHOLOGY

CL	CP	L	P
1	0	15	0

INSTRUCTOR INCHARGE: MSc Psychology or PhD in Psychology or M Optom with experience in teaching Psychology

COURSE DESCRIPTION: This course covers various aspects of Behavioral health psychology essential for the optometrist.

OBJECTIVES: At the end of the course, the student would have gathered knowledge various aspects of Behavioral health psychology essential for him to apply in the clinical scenario during his clinical postings.

TEXT BOOK: Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013

REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: Basic clinical knowledge**.**

COURSE PLAN

Unit	Topics	Hours
1	Evolution of Psychology, Personality theories, Developmental psychology; Introduction to Psychology, History of Psychology - Structuralism, Functionalism, Psychoanalytic of Sigmund Freud, Behaviourism, Gestalt psychology,Humanistic Psychology, Cognitive Psychology, Feministic Psychology, Multicultural Psychology Personality Theories : Biomedical Model, Psycholanalytic theory - Personality structure, stages, Defense mechanisms, Behavioural Psychology - Classical Conditioning, Operant Conditioning, Vicarious/Observational learning behaviour), Positive Psychology (Martin Seligman), Humanistic Psychology (Carl Roger), Maslow's Hierchy of Needs ,Eclectic approach, Nature Versus Nurture of Personality Developmental Psychology : Psychosexual stages of development, Psychosocial stages of development, Cognitive theory of development, Theory of moral development, social Cultural development - Sigmund Freud, Erickson, Piaget, Kohlberg, Lev Vygotsky, Bronfenbrenner's.	5

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2	Introduction to Health Psychology - What is Health Psychology, Father of health Psychology, What constitutes well being? Models of Health Psychology - Biomedical Model and Biopsychosocial model Health Behaviour models - Health Belief Model, Transtheoretical Model, social Cognitive Theory, Theory of Planned behaviour. Health Promotion - Precede Proceed model Illness belief. Beliefs that influence practitioners.	5
3	Partnerships in health: Client-professional partnership. Issues in Client engagement with treatment, involving clients in care, chronic illness, disability, complex health issues, attitude and background of clients. Personality disorders. Depression Disorders. Anxiety disorders. Pain and types. Loss and models of Loss. Stress and Coping strategies. Compassionomics in healthcare.	5

INTRODUCTION TO QUALITY AND PATIENT SAFETY

CL	CP	L	P
1	0	15	0

INSTRUCTOR INCHARGE: Qualified personnel to handle the subject, preferably who have experience in handling such scenarios practically or at least experience in teaching.

COURSE DESCRIPTION: This course deals with various aspects of quality and safety issues in health care services.

OBJECTIVES: At the end of the course, students have gained introductory knowledge about quality and patient safety aspects from Indian perspectives.

TEXT BOOK: Faculty can decide

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COURSE PLAN:

Unit	Topics	Hours
1	Quality assurance and management	3
2	Basics of emergency care and life support skills	3
3	Biomedical waste management and environment safety	3
4	Infection and prevention control	2
5	Antibiotic resistance	2
6	Disaster preparedness and management	2

CLINICAL OPTOMETRY IV

CL	CP	L	P
0	4	0	120

Students will improve their skills in clinical procedures, and then progressive interactions with patients and professional personnel are monitored as students practice optometry in a supervised setting. Additional areas include problem solving and complications of various managements will be inculcated. Students should have exposure to eye bank facilities and must be made aware of eye donation, collection of eyes, preservation, pre and post-operative instructions and latest techniques for preservation of donor cornea. The students will get clinical training on the practical aspects of the following courses namely optometric optic –II, visual optics – II and ocular disease -II.

PRACTICALS

1. History taking- Ocular and Special clinical conditions
2. Refraction

a. Subjective

b. Objective

3. Keratometry in special conditions like Keratoconus, High Astigmatism, Pterygium, Post ocular surgery
4. Lensometry - Bifocals and PAL's
5. Pupillometry

6. Tonometry

a. Applanation

b. Other Tonometers

7. AC Grading - Van Herick method

8. Gonioscopy

Fifth Semester

SYSTEMIC DISEASES

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: MD General Medicine with adequate experience in academic teaching and handling patients.

COURSE DESCRIPTION: This course deals with definition, classification, clinical diagnosis, complications and management of various systemic diseases. In indicated cases ocular manifestations also will be discussed.

COURSE OBJECTIVES: At the end of the course, students should get acquainted with the following:

1. Common Systemic conditions: Definition, diagnostic approach, complications and management options

2. Ocular findings of the systemic conditions

3. First Aid knowledge

TEXT BOOKS:

1. C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002

2. Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999

COURSE PLAN

Unit	Topics	Hours
1	Hypertension , Diabetes Mellitus, Acquired Heart disease, Thyroid Disease: Definition, classification, Epidemiology, clinical examination, complications, and management. Ophthalmic considerations for the diseases	10
2	Cancer, Tropical infections, Tuberculosis, Herpes virus, Hepatitis, Acquired Immunodeficiency Syndrome: Definition, classification, Epidemiology, clinical examination, complications, and management. Ophthalmic considerations for the diseases	10
3	Anaemia, Nutritional and metabolic disorders, Myasthenia Gravis, Connective Tissue Disease: Definition, classification, Epidemiology, clinical examination, complications, and management. Ophthalmic considerations for the diseases	10

DISPENSING OPTICS

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M.Optom with experience in Optical Dispensing & Optical Laboratory

COURSE DESCRIPTION: This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. In addition deals with role of optometrists in optical set-up.

OBJECTIVES: Skills/knowledge to be acquired at the end of this course:

1. To select the tool power for grinding process
2. Different types of materials used to make lenses and its characteristics
3. Lens designs–Bifocals, progressive lens
4. Tinted, Protective & Special lenses
5. Spectacle frames –manufacture process & materials

6. Art and science of dispensing spectacle lens and frames based on the glass prescription.

7. Reading of spectacle prescription. Counseling the patient

8. Lens edge thickness calculation

9. Frame & lens measurements and selection

10. Writing spectacle lens order

11. Facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)

12. Lens verification and axis marking and fitting of all lens types

13. Final checking of finished spectacle with frame adjustments

14. Delivery and follow-up

15. Troubleshooting complaints and handling patient's questions

TEXT BOOK/REFERENCE BOOKS

1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008

2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996

3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth - Heinemann, 2007

4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

5. A handbook on practical approach to troubleshooting and solution in spectacle dispensing - Lavanya Kalikivayi, Venkataramana Kalikivayi

PREREQUISITES: Geometrical Optics, Physical Optics & Ocular Physiology, Optomteric Optics

COURSE PLAN

Unit	Topic	Hours
1	Lens designs - compatible to contemporary eye frames. Components of spectacle prescription & interpretation, transposition, Add and near power relation	6
2	Frame selection –based on spectacle prescription, professional requirements, age group, face shape. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height. Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt, Dispensing for Myopia management spectacles	6
3	Neutralization –Hand & lensometer, axis marking, prism marking. Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction).	6
4	Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements). Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles	6
5	Spectacle repairs –tools, methods, soldering, riveting, Frame adjustments Special types of spectacle frames: Monocles, Ptosis crutches, Industrial safety glasses, Welding glasses, Frame availability in Indian market	6

PRACTICALS (30 hours)

1. Inter pupillary distance measurements using PD ruler and Pupillometry
2. Face and frame measurements and frame selection for dispensing spectacles.
3. Criteria of Selection for patients, spectacle frames for dispensing special ophthalmic lenses – prisms, bifocal, progressive, aspheric, lenticular, high index lenses, etc.
4. Bifocals - Measurements, Fitting , Verification and troubleshooting
5. Progressive Lenses – Special measurements, fitting, verification and troubleshooting.

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6. Types of Progressive lenses available in India – Brand names, raw material properties, manufacturers suppliers details, ordering systems, etc.

7. Myopia management spectacles dispensing- DIMS, HALT etc

8. Glazing, cutting and fitting Ophthalmic Lenses in all types of spectacle frames.

9. Frame manipulations and repairs

10. Troubleshooting and problem solving of patients after Spectacle dispensing

GERIATRIC OPTOMETRY

CL	CP	L	P
3	0	45	0

INSTRUCTOR INCHARGE: M Optom with adequate experience in handling geriatric patients.

COURSE DESCRIPTION: This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients.

COURSE OBJECTIVES: The student on taking this course should

1. Be able to identify, investigate the age related changes in the eyes.
2. Be able to counsel the elderly
3. Be able to dispense spectacles with proper instructions.
4. Adequately gained knowledge on common ocular diseases.

TEXT BOOKS: Changes and Diseases of the Aging Eye by Bruce P. Rosenthal

REFERENCE BOOKS:

1. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005

2. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998

3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN

Unit	Topic	Hours
1	Aspects of ageing: Introduction to geriatrics and gerontology, epidemiology of geriatrics in India, GNFC-AOA statistics and Functional Perspective on Ageing, physiological and pathological changes in ageing	10
2	Effects of ageing on Cardiovascular system, respiratory system, gastro-intestinal, excretory and central nervous system.	12
3	Preventive geriatrics – Periodical health assessment, lifestyle and dietary pattern. Healthy ageing- physical, mental and social health, Social aspects of Ageing and Psychological aspects of Ageing, Pharmacological aspects of aging	10
4	Optometric examination and management of the elderly: Ageing changes in the eye, Optometric Examination of the Elderly patient, Fitting and Dispensing spectacle for the elderly patient, Age related Eye Diseases, Ocular Implication of systemic diseases in the elderly, Management of geriatric patients	13

PEDIATRIC OPTOMETRY

CL	CP	L	P
3	0	45	0

INSTRUCTOR INCHARGE: M Optom with adequate experience in handling paediatric patients.

COURSE DESCRIPTION: This course is designed to provide the students adequate knowledge in theoretical and practical aspects of diagnosis, and management of eye conditions related to paediatric population. Also it will inculcate the skill of transferring / communicating the medical information to the attender / patient by the students. The scope of this subject is to train the optometrists to develop a systematic way of dealing with children below 12, so as to implement primary eye care and have better, specialized management of anomalies.

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COURSE OBJECTIVES: At the end of the course the student is expected to:

1. Have a knowledge of the principle theories of childhood development, and visual development

2. Have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues

3. Be familiar with the accommodative-vergence system, the genesis of ametropia, the disorders of refraction, accommodation and vergence, and the assessment and management of these disorders

4. Be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus

5. Have a knowledge of the epidemiology of eye disease in children, the assessment techniques available for examining visual function of children of all ages and an understanding varied management concepts of paediatric vision disorders

6. Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.

7. Have a capacity for highly evolved communication and co-management with other professionals involved in paediatric assessment and care

TEXT BOOKS:

1. Pediatric Optometry - JEROME ROSNER, Butterworth, London 1982

2. Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth – Heinemann, 2004

REFERENCE BOOKS:

1. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis, 1980.

2. Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.

3. Clinical pediatric optometry. LJ Press, BD Moore, Butterworth- Heinemann, 1993

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN

Unit	Topic	Hours
1	Development of the eye and the paediatric milestones: Ocular Embryology, Developmental Milestones	5
2	Normal appearance, pathology and structural anomalies: Orbit, Eye lids, Lacrimal system, Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil, Lens, vitreous, Fundus Oculomotor system	10
3	Paediatric eye disorders : Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics, Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism	10
4	Paediatric eye examination: Overview – Paediatric eye examination, History taking Paediatric subjects, Visual Acuity Assessment in different age groups, Refractive Examination	10
5	Determining binocular status, Determining sensory motor adaptability, Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia, Remedial and Compensatory treatment of Strabismus and Nystagmus Spectacle dispensing for children, Paediatric contact lenses, Low vision assessment in children	10

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PRACTICALS

1. Demonstrate vision assessment using different vision testing charts/techniques for different paediatric age groups
2. Handling and performing comprehensive eye examination for a pediatric patient

DIAGNOSTICS AND THERAPEUTICS OF ANTERIOR SEGMENT DISEASES

CL	CP	L	P
4	0.5	60	15

INSTRUCTOR INCHARGE: M Optom with adequate experience in clinical routine, diagnostic technique and interpretation and handling patients.

COURSE DESCRIPTION

This course consists of the pathophysiology, pharmacotherapy, and clinical management of systemic and ocular disease through a combination of lectures and team-based learning approaches. The basic principles of pharmacology will be followed by overviews of drugs used to treat diseases of each system. The role of the optometrist in the health care system will be emphasized.

OBJECTIVES

- To Diagnose and sequential anterior segment ocular disease management
- To list down management options in terms of optometric, pharmacological, LASER and surgical categories
- To determine sequential management protocol and other referral needs

TEXT BOOKS:

Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

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PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease, Ocular pharmacology

COURSE PLAN:

Unit	Topic	Hours
1	Pathophysiology and clinical management of systemic and anterior segment ocular disease	10
2	Overview of drugs used in treatment of anterior segment disease	10
3	LASER for anterior segment disease management, overview of surgical intervention for anterior segment disease	10
4	Vertical Integration of all treatment options of anterior segment disease with special emphasis on optometric management	10
5	Interpretation and diagnose conditions using – Biometry (Contact and Non-Contact), Corneal Topography, Pentacam, Anterior Segment Optical Coherence Tomography, Specular Microscopy, Meibography	10
6	Interpretation and diagnose conditions using – Perimetry, Posterior segment Optical Coherence Tomography, Ultrasound Biomicroscopy, Heidelberg Retinal Tomography (Cornea and Optic Nerve)	10

PRACTICALS

1. Perform and Interpret Biometry (Contact and Non-Contact), Corneal Topography, Pentacam, Anterior Segment Optical Coherence Tomography, Specular Microscopy, Meibography
2. Perform and Interpret Perimetry, Posterior segment Optical Coherence Tomography, Ultrasound Biomicroscopy, Heidelberg Retinal Tomography (Cornea and Optic Nerve)

INNOVATION AND TECHNOLOGY

CL	CP	L	P
1	0.5	15	15

Instructor in charge: M Optom with adequate experience in research, medical technology

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Course Description

The course will cover advancements and innovations in medical and optometric instruments, ocular diagnostics, service delivery and management of ocular diseases. Students will get an opportunity to learn, develop and validate new instruments, softwares for vision and eye testing and data managing systems.

Objectives

1. To cover comprehensively the process of converting an idea into a product
2. To understand the design, working principle and optics of ophthalmic instruments
3. To design and develop hardware and software for vision and eye testing
4. To understand the basics of health and optometry informatics
5. To develop software for management of eye health data

Text book: Faculty can decide

Prerequisites: Core optometry and specialty optometry courses

Course plan

Unit	Topic	Hours
1	Research & Ideation: Concepts. Understanding design and optics behind ophthalmic instruments	5
2	Prototype development	5
3	Clinical validation	5

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PRACTICAL (15 hours)

1. Develop a prototype of a simple clinical instrument and validate for clinical use

CL	CP	L	P
2	4	30	120

CLINICAL OPTOMETRY V

The course provides students the opportunity to continue to develop confidence and increased skill in diagnosis and treatment delivery. Students will demonstrate competence in basic, intermediate and advanced procedures in those areas. Students will participate in advanced and specialized diagnostic and management procedures. Students will get practical experience of the knowledge acquired from geriatric and paediatric optometry courses. Hands-on experience under supervision will be provided in various outreach programmes namely, school vision screening, glaucoma and diabetic retinopathy screening etc., Students also get hand-on practical sessions on the following courses namely, contact lens, low vision care, geriatric optometry and paediatric optometry. This course will also offer a systematic introduction to the scope and framework to keep us up-to-date and examine the knowledge we use and the treatment and management recommendations we make.

COURSE PLAN

Unit	Topic	Hours
1	Evidence Based Practice on the following Common Clinical Conditions Myopia/ Hyperopia Astigmatism Presbyopia Headache	15
2	Evidence Based Practice on the following Common Clinical Conditions Cataract Open Angle Glaucoma Angle closure glaucoma	15

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PRACTICALS:

1. Lens fitting
2. Frame measurements
3. Ocular Measurements - Axial, ACD, LT
4. Slit Lamp evaluation of anterior segment
5. Retina Evaluation

a. 78D and 90 D

b. Direct Ophthalmoscopy

c. Indirect Ophthalmoscopy

6. Topography, Pentacam, Pachymetry,Specular Microscopy and Aberrometry Interpretation
7. Meibography Interpretation
8. OCT Interpretation
9. Visual Field Interpretation

Sixth Semester

CONTACT LENSES I

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M.Optom practicing contact lens specialties

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

COURSE OBJECTIVES: Upon completion of the course, the student should be able to:

1. Understand the basics of contact lenses
2. List the important properties of contact lenses
3. Finalise the CL design for various kinds patients
4. Recognize various types of fitting
5. Explain all the procedures to patient
6. Identify and manage the adverse effects of contact lens

TEXT BOOKS:

1. IACLE modules A-F
2. CLAO Volumes 1, 2, 3
3. IACLE case discussion series also for resources for teaching
4. Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006

REFERENCE BOOKS

1. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004.

2. E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN

Unit	Topics	Hours
1	Introduction to Contact lenses: Definition, Classification / Types. History of Contact Lenses. Optics of Contact Lenses: Magnification & Visual field, Accommodation & Convergence, Back & Front Vertex Power / Vertex distance calculation. Review of Anatomy & Physiology of Tear film, Cornea, Lids & Conjunctiva	6
2	Introduction to CL materials: Monomers, Polymers, Properties of CL materials: Physiological (Dk, Ionicity, Water content), Physical (Elasticity, Tensile strength, Rigidity), Optical (Transmission, Refractive index), Indications and contraindications, Parameters / Designs of Contact Lenses & Terminology	6
3	RGP Contact Lens materials, Manufacturing Rigid and Soft Contact Lenses – various methods, Pre-Fitting examination – steps, significance, recording of results, Correction of Astigmatism with RGP lens. Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses. Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses. Calculation and finalising Contact lens parameters.	6

4	Ordering Rigid Contact Lenses – writing a prescription to the Laboratory. Checking and verifying Contact lenses from Laboratory. Modifications possible with Rigid lenses. Common Handling Instructions: Insertion & Removal Techniques, Do's and Dont's	6
5	Care and Maintenance of Rigid lenses: Cleaning agents & Importance, Rinsing agents & Importance, Disinfecting agents & importance, Lubricating & Enzymatic cleaners. Follow up visit examination. Complications of RGP lenses	6

PRACTICAL (30 hours)

1. Measurement of Ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and TBUT
4. Schrimers test, Slit lamp examination of tear layer
5. Keratometry
6. Placido's disc
7. Soft Contact Lens fitting – Aspherical
8. Soft Contact Lens fitting – Lathecut lenses
9. Soft Contact Lens over refraction
10. Lens insertion and removal
11. Lens handling and cleaning
12. Examination of old soft Lens
13. RGP Lens fitting
14. RGP Lens Fit Assessment and fluorescein pattern
15. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus)
16. RGP over refraction and Lens flexure
17. Examination of old RGP Lens
18. RGP Lens parameters
19. Slit lamp examination of Contact Lens wearers

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LOW VISION CARE AND REHABILITATION

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M Optom practicing low vision and rehabilitation

COURSE DESCRIPTION: This course deal with the definition of low vision, epidemiology aspect of visual impairment, types of low vision devices and its optical principles, clinical approach of the low vision patients, assistive devices for totally visually challenged, art of prescribing low vision devices and training the low vision patients and other rehabilitation measures.

COURSE OBJECTIVES: At the end of the course, the student will be knowledgeable in the following:

1. Definition and epidemiology of Low Vision
2. Clinical examination of Low vision subjects
3. Optical, Non-Optical, Electronic, and Assistive devices.
4. Training for Low Vision subjects with Low vision devices
5. Referrals and follow-up

TEXT BOOKS:

1. Functional Assessment of Low Vision by Bruce P.Rosenthal

2. Remediation and Management of Low Vision Mosby's optometric problem solving series; Editors, Roy Gordon Cole, *Bruce* P. *Rosenthal*

REFERENCE BOOKS:

1. Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998

2. Sarika G, Sailaja MVSE Vaithilingam: practice of Low vision –A guide book, Medical Research Foundation, 2015.

3. Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999

4. Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991

5. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

COURSE PLAN:

Unit	Topics	Hours
1	Definitions & classification of Low vision, Epidemiology of low vision, Model of low vision service	7
2	Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision, Types of low vision aids – optical aids, non-optical aids & electronic devices, Optics of low vision aids	7
3	Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training, Pediatric Low Vision care, Low vision aids – dispensing & prescribing aspects	8
4	Visual rehabilitation & counselling, Legal aspects of Low vision in India, Case Analysis	8

PRACTICALS (30 hours)

1. Attending in low vision care clinic and history taking.
2. Determining the type of telescope and its magnification (Direct comparison method & calculated method)
3. Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.
4. Inducing visual impairment and prescribing magnification.
5. Determining reading speed with different types of low vision aids with same magnification.
6. Determining reading speed with a low vision aid of different magnifications

BINOCULAR VISION I

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M Optom practicing in Binocular Vision and Vision Therapy.

COURSE DESCRIPTION: This course provides theoretical aspects of Binocular Vision and its clinical application. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extraocular muscles, various binocular vision anomalies, its diagnostic approaches and management.

COURSE OBJECTIVES: On successful completion of this module, a student will be expected to be able to:-

1. Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.

2. Provide a detailed explanation of, and differentiate between the etiology, investigation and management of binocular vision anomalies.

3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

TEXT BOOKS:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.

2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd

3. Gunter K. V. Mosby Company

4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular VisionHeterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

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PREREQUISITES: Ocular anatomy, Physiology

COURSE PLAN

Unit	Topics	Hours
1	Binocular Vision and Space perception: Relative subjective visual direction, Retino motor value, Grades of BSV, SMP and Cyclopean Eye, Correspondence, Fusion, Diplopia, Retinal rivalry, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV, Stereopsis and monocular clues – significance, Egocentric location, clinical applications, Theories of Binocular vision.	6
2	Anatomy of Extra Ocular Muscles: Rectii and Obliques, LPS, Innervation & Blood Supply. Physiology of Ocular movements: Center of rotation, Axes of Fick, Action of individual muscle. Laws of ocular motility: Donder's and Listing's law, Sherrington's law, Hering's law. Uniocular & Binocular movements - fixation, saccadic & pursuits: Version &Vergence, Fixation & field of fixation	6
3	Near Vision Complex Accommodation: Definition and mechanism (process), Methods of measurement, Stimulus and innervation, Types of accommodation, Anomalies of accommodation – aetiology and management. Convergence: Definition and mechanism, Methods of measurement, Types and components of convergence - Tonic, accommodative, fusional, proximal. Anomalies of Convergence – aetiology and management.	6
4	Sensory adaptations: Confusion, Suppression, Investigations, Management. Abnormal Retinal Correspondence: Investigation and management, Blind spot syndrome. Eccentric Fixation: Investigation and management.	6
5	Amblyopia : Classification, Aetiology, Investigation, Management	6

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PRACTICALS: (30 hours)

Deals with hand-on session the basic binocular vision evaluation techniques

DIAGNOSTICS AND THERAPEUTICS OF POSTERIOR SEGMENT DISEASES

Instructor in charge: M Optom with adequate experience in clinical routine, diagnostic technique and interpretation and handling patients

CL	CP	L	P
4	0.5	60	15

Course description

This course consists of the pathophysiology, pharmacotherapy, and clinical management of systemic and ocular disease through a combination of lectures and team-based learning approaches. The basic principles of pharmacology will be followed by overviews of drugs used to treat diseases of each system. The role of the optometrist in the health care system will be emphasized.

Objectives

- To Diagnose and sequential posterior segment ocular disease management
- To list down management options in terms of optometric, pharmacological, LASER and surgical categories
- To determine sequential management protocolo and other referral needs
- To propose schematic management options available for all posterior segment disease
- To sequence management options in terms of optometric, pharmacology, LASER and surgery.
- To identify stakeholders for referral

TEXT BOOKS: Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

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Prerequisites: Ocular diseases, ocular diagnostics, optometric instruments, ocular pharmacology

Course plan

Unit	Topics	Hours
1	Pathophysiology and clinical management of systemic and posterior segment ocular disease	10
2	Overview of drug used in treatment of posterior segment disease	10
3	LASER for posterior segment disease management, overview of surgical intervention for posterior segment disease	10
4	Vertical Integration of all treatment options of posterior segment disease with special emphasis on optometric management	10
5	Perform, interpret and diagnose anterior and posterior segment diseases images, Fundus Fluorescein Angiography, Electrodiagnostics and Visual Evoked Potential	10
6	Perform, interpret and diagnose conditions using – Contrast acuity, Potential acuity meter, Retinometer, Brightness acuity test, Photostress test, Amsler charting	10

PRACTICAL (15 hours)

- Direct ophthalmoscopy examination
- 90D examination of Optic disc
- Fundus photography
- Other procedure
- Contrast acuity
- Potential acuity meter
- Retinometer, Brightness acuity test
- Photostress test
- Amsler charting

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OPTOMETRY AND MULTIDISCIPLINARY ASPECTS OF HEALTH

CL	CP	L	P
4	1	60	15

Instructor in charge: M Optom with adequate experience in clinical routine, diagnostic technique and interpretation and handling patients**.**

Course Description

The course will cover integrating eye health systems into multispecialty care. This would help students understand about the holistic needs of the patients and gain knowledge on the health care delivery systems. Setting up independent optometry practices integrated with other healthcare disciplines would enable co management, improve the referral pattern, provide convenient and cost effective care for patients.

Objectives

1. To appreciate the connection between ocular and systemic diseases and rehabilitation
2. To integrate systemic diseases and be aware of the health care delivery systems
3. To understand the primary, secondary and tertiary eye care services
4. To understand the need for integrating eye care services into other health care delivery models

TEXT BOOKS: Faculty to decide

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Prerequisites: Good knowledge on ocular diseases, systemic diseases, pediatric and geriatric optometry, low vision and rehabilitation.

Course plan

Unit	Topics	Hours
1	Health care models 1. International health care models 2. National health care models 3. Decentralized health care delivery systems 4. Pros and cons of different health care models 5. Universal health coverage	15
2	General and systemic rehabilitation services 1. Models of health care for different systemic illness 2. Rehabilitation models 3. Referral to rehabilitation setups	15
3	Primary, secondary and tertiary eye care models 1. Preventive, promotive and curative eyecare 2. Primary, secondary and tertiary eye care	15
4	Integrating health care professions 1. Integration of primary health and primary eye care 2. Integration of eye care services to bigger model of health care 3. Problem oriented health care records 4. Co-management with other healthcare specialties 5. Development of comprehensive management plan 6. Benefits of multidisciplinary approach to eye care	15

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PRACTICAL (15 hours)

Visit to Public health centres

RESEARCH METHODOLOGY & BIOSTATISTICS

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: M.Optom with experience in biostatistics and research methodology or Biostatistician/Epidemiologist

COURSE OBJECTIVES: The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

TEXT BOOKS:

1. Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., W. B. Saunders Co.

2. Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.

3. Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

COURSE PLAN

Unit	Topics	Hours
1	Research Methodology: Introduction to research methods, Identifying research problem, Ethical issues in research, Research design, Types of Data, Research tools and Data collection methods, Sampling methods, Developing a research proposal	10
2	Biostatistics: Introduction, Central Limit Theorem, Measures of Morality, Sampling, Statistical significance, Correlation, Sample size determination Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion	10
3	Statistical tests to compare means in normal and not normal distribution with one or more groups. Tests to check for association between groups. Use of computerized software for statistics	10

CLINICAL OPTOMETRY VI

CL	CP	L	P
2	4	30	120

The course is the final series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship. This course will also offer a systematic introduction to the scope and framework to keep us up-to-date and examine the knowledge we use and the treatment and management recommendations we make.

COURSE PLAN

Unit	Topic	Hours
1	Evidence Based Practice on the following Common Clinical Conditions Blepharitis/ Chalazion /Stye Pinguecula,Conjunctival Cyst, Concretions, Conjunctival Naevus Pterygium Pseudophakia/ Aphakia	15
2	Evidence Based Practice on the following Common Clinical Conditions Dry eye Esotropia/ Exotropia/ Other types of Squint Acute Red eye/ Subconjunctival Hemorrhage/ Conjunctivitis	15

Practicals:

1. Comprehensive eye examination
2. Community out-reach (Screening camps, Awareness camps and impact assessments for children, adult and geriatric population and occupation specific camps)
3. Basic BV work up
4. Low Vision assessment
5. Contact Lens Fitting - Soft lens
6. Contact Lens fitting - RGP lens
7. Interpretation of OCT - Posterior Segment

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Seventh Semester

CONTACT LENSES II

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M Optom practicing contact lens specialties

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

COURSE OBJECTIVES: Upon completion of the course, the student should be able to:

1. Understand the basics of contact lenses
2. List the important properties of contact lenses
3. Finalize the CL design for various kinds patients
4. Recognize various types of fitting
5. Explain all the procedures to patient
6. Identify and manage the adverse effects of contact lens

TEXT BOOKS:

1. IACLE modules A-F
2. CLAO Volumes 1, 2, 3
3. IACLE case discussion series also for resources for teaching
4. Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006
5. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
6. E S. Bennett, V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN

Unit	Topics	Hours
1	SCL Materials & Review of manufacturing techniques Comparison of RGP vs. SCL Pre-fitting considerations for SCL Fitting philosophies for SCL Fit assessment in Soft Contact Lenses: Types of fit – Steep, Flat, Optimum Calculation and finalising SCL parameters 1. Disposable lenses 2. Advantages and availability	5
2	Soft Toric CL 1. Stabilization techniques 2. Parameter selection 3. Fitting assessment	4
3	Common Handling Instructions 1. Insertion & Removal Techniques 2. Do's and Dont's Complications of Soft lenses	4
4	Care and Maintenance of Soft lenses 1. Cleaning agents & Importance 2. Rinsing agents & Importance 3. Disinfecting agents & importance 4. Lubricating & Enzymatic cleaners Follow up visit examination	5

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5	Therapeutic contact lenses 1. Indications 2. Fitting consideration	5
6	Specialty fitting 1. Aphakia 2. Pediatric 3. Corneal ectasia 4. Post refractive surgery 5. Ocular surface disease 6. Occupational fitting	5
7	Management of Presbyopia with Contact lenses	2

PRACTICAL (30 HOURS)

1. Examination of old soft Lens
2. RGP Lens fitting
3. RGP Lens Fit Assessment and fluroscein pattern
4. Special RGP fitting (Aphakia, pseudo phakia&Keratoconus)
5. RGP over refraction and Lens flexure
6. Examination of old RGP Lens
7. RGP Lens parameters
8. Fitting Cosmetic Contact Lens
9. Slit lamp examination of Contact Lens wearers
10. Fitting Toric Contact Lens
11. Bandage Contact Lens
12. SPM & Pachymetry
13. Specialty Contact Lens fitting.

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BINOCULAR VISION II

CL	CP	L	P
2	1	30	30

INSTRUCTOR INCHARGE: M Optom practicing Binocular Vision and Vision Therapy

COURSE DESCRIPTION: This course deals with understanding of strabismus, its classification, necessary orthoptic investigations, diagnosis and non-surgical management. Along with theoretical knowledge it teaches the clinical aspects and application.

COURSE OBJECTIVES: The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose case of strabismus with comments in respect to retinal correspondence and binocular single vision. The student should be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

TEXT BOOKS:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.

2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd

3. Gunter K. Von Noorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company

4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

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PREREQUISITES: Ocular Anatomy, Ocular Physiology, Binocular Vision –I.

COURSE PLAN

Unit	Topics	HOURS
1	Neuro-muscular anomalies 1. Classification and etiological factors History – recording and significance	1
2	Convergent strabismus Accommodative convergent squint 1. Classification 2. Investigation and Management Non accommodative Convergent squint 1. Classification 2. Investigation and Management Divergent Strabismus 1. Classification 2. A& V phenomenon 3. Investigation and Management Vertical strabismus 1. Classification 2. Investigation and Management Paralytic Strabismus 1. Acquired and Congenital 2. Clinical Characteristics Distinction from comitant and restrictive Squint	8

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3	Investigations 1. History and symptoms 2. Head Posture 3. Diplopia Charting 4. Hess chart 5. PBCT 6. Nine directions 7. Binocular field of vision	8
4	Treatment of Amblyopia Nystagmus	4
5	Non-surgical Management of Squint	2
6	Restrictive Strabismus 1. Features 2. Musculo-fascical anomalies 3. Duane's Retraction syndrome 4. Clinical features and management 5. Brown's Superior oblique sheath syndrome 6. Strabismus fixus 7. Congenital muscle fibrosis	6
7	Surgical management of squint	1

PRACTICAL (30 HOURS)

Deals with hand-on session the basic binocular vision evaluation techniques.

PUBLIC HEALTH & EPIDEMIOLOGY

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: M Optom with public health experience or Public Health professional

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COURSE DESCRIPTION: Introduction to the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario.

COURSE OBJECTIVES: At the end of the course students will be be knowledgeable in the following areas:

1. Community based eye care in India.
2. Prevalence of various eye diseases
3. Developing Information Education Communication materials on eye and vision care for the benefit of the public
4. Organize health education programmes in the community
5. Vision screening for various eye diseases in the community and for different age groups.

TEXT BOOKS:

1. GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002
2. Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980
3. K Park: Park's Text Book of Preventive and Social Medicine, 19th edition, Banarsidas Bhanot publishers, Jabalpur, 2007

REFERENCE BOOKS: MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002

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PREREQUISITES: Ocular Disease, Visual optics, Optometric Instruments, Clinical Examination of Visual System

COURSE PLAN

Unit	Topics	Hours
1	Public Health Optometry: Concepts and implementation, Stages of diseases Dimensions, determinants and indicators of health	5
2	Levels of disease prevention and levels of health care patterns	5
3	Contrasting between Clinical and community health programs Community based rehabilitation programs	5
4	National and International health agencies, Organization and Management of Eye Care Programs – Service Delivery models	5
5	Health manpower and planning & Health Economics Evaluation and assessment of health programmes IEC Materials, KAP survey	5
6	Principles of Epidemiology and Epidemiological Methods Health Information and Basic Medical Statistics Descriptive epidemiology: Person, place, time Prevalence, Incidence and Magnitude of diseases Screening in the detection of disease Sampling & Sample size determination	5

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LAW AND PROFESSIONAL ETHICS – OPTOMETRY

CL	CP	L	P
1	0	15	0

INSTRUCTOR INCHARGE: M Optom or Lawyer with relevant experience in teaching legal aspects of medicine

COURSE DESCRIPTION: Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

TEXTBOOK:

1. Medico-Legal and Ethical Issues in Eye Care: Case Senarios for Optometrists, Opticians, Ophthalmologists and Family Physicians by Kah Guan Au Eong , Catherine Tay
2. Law and Ethics for the Eye Care Professional Barbara K Pierscionek London : Butterworth Heinemann Elsevier 2008
3. Code of conduct and ethics document for optometrists on OCI website

Reference:

Law and Optometry: A guide for optometry professionals and optometry students in India, Vijaya kumar

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COURSE PLAN

Unit	Topics	Hours
1	Medical ethics - Definition - Goal - Scope · Introduction to Code of conduct · Basic principles of medical ethics –Confidentiality	2
2	Malpractice and negligence - Rational and irrational drug therapy · Autonomy and informed consent - Right of patients	3
3	Care of the terminally ill- Euthanasia · Organ transplantation	2
4	Medico legal aspects of medical records –Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.	5
5	Professional Indemnity insurance policy Development of standardized protocol to avoid near miss or sentinel events Obtaining an informed consent.	3

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COMMUNITY EYE HEALTH

CL	CP	L	P
0	1.5	0	45

Instructor in charge: Optometrist (M Optom/ Ph D) with adequate experience in planning and delivery community eye health projects

Course description

The course would help students apply theories taught in the public health and epidemiology course. The basic principles of public health, Ten Commandments of screening, screening of specific eye health ailments, data collection, data management and technical and non-technical reporting of the screenings conducted will be emphasized.

Students will be posted in community outreach activities of the organization. Students will get hands-on experience in handling community eye health programmes including school eye screening programs, adult comprehensive eye examination, cataract screening etc.

Objectives

- Learn the principles and commandments of Screening
- Learn Implementation and evaluation of a community outreach program
- Participate in community outreach programs
- To organize and conduct an Eye camp

TEXT BOOKS:

1. Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980

2. K Park: Park's Text Book of Preventive and Social Medicine, 19th edition, Banarsidas Bhanot publishers, Jabalpur, 2007

REFERENCE BOOKS: Faculty may decide.

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PREREQUISITES: All core Optometry courses

COURSE PLAN

To be involved in all community outreach activities of the institution.

Unit	Topics	Hours
1	Exclusive training of • School screenings. • Vision screening of different ages and occupations. • Diabetic retinopathy screening, • Glaucoma Screening, • Geriatric doorstep care, • Special children vision screening.	5

CLINICAL OPTOMETRY VII

CL	CP	L	P
2	4	30	120

The course is the final series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship. This course will also offer a systematic introduction to the scope and framework to keep us up-to-date and examine the knowledge we use and the treatment and management recommendations we make.

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COURSE PLAN:

Unit	Topic	Hours
1	Evidence Based Practice on the following Common Clinical ConditionsConditions Corneal abrasion/ Corneal Ectasia/ Corneal Ulcer/Corneal Opacity Ptosis Proptosis Ectropion, Entropion	15
2	Evidence Based Practice on the following Common Clinical Conditions Uveitis Acute Dacryocystitis Ocular Trauma	15

PRACTICALS:

1. Comprehensive eye examination
2. Community out-reach (Screening camps, Awareness camps and impact assessments for children, adult and geriatric population and occupation specific camps)
3. Comprehensive BV work up and Vision Therapy
4. Low Vision assessment and Management
5. Special Children evaluation (Observation)
6. Interpretation of specialty Contact Lens Fitting - Video Demonstration
7. Retinal Diagnostics Interpretation (OCT, HRA, FFA, ICG, OCTA, ERG, EOG, mfERG)

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RESEARCH PROJECT 1

CL	CP	L	P
0	3	0	90

Instructor in charge: M Optom with experience in handling Research projects

Course description

Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Students will get the experience of doing research in a systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing and presentation.

Objectives

· To acquire the basic knowledge and experience of conducting research systematically

· To demonstrate an understanding of the relevant roles and responsibilities involved

· To conduct basic review of literature

· To design a brief methodology

TEXT BOOKS: Faculty can decide

REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: All core Optometry courses

Project is spread from seventh to eighth semester.

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Eighth Semester

OCCUPATIONAL OPTOMETRY

CL	CP	L	P
2	0.5	30	15

INSTRUCTOR INCHARGE: M Optom with relevant experience in occupational eye health

COURSE DESCRIPTION: This course deals with general aspects of occupational health, Visual demand in various job, task analysing method, visual standards for various jobs, occupational hazards and remedial aspects through classroom sessions and field visit to the factories.

COURSE OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects:

1. In visual requirements of jobs;
2. In effects of physical, chemical and other hazards on eye and vision;
3. To identify occupational causes of visual and eye problems;
4. To be able to prescribe suitable corrective lenses and eye protective wear based on occupation and sport
5. To set visual requirements, standards for different jobs.

TEXT BOOKS:

1. PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's text book of Occupational optometry. 1st edition, Published by Elite School of optometry , unit of Medical Research Foundation, Chennai, India , 2015
2. R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001

REFERENCE BOOKS:

1. G W Good: Occupational Vision Manual available in the following website: www.aoa.org
2. N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999
3. J Anshel: Visual Ergonomics Handbook, CRC Press, 2005
4. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008

COURSE PLAN:

Unit	Topics	Hours
1	Introduction to occupational health, National and international organisations/agencies of occupational health, Labour reforms, Occupational health centre in organised sector, Health care for workers in unorganised sector, Role of occupational health physician, Industrial hygienist, and Safety officer; Occupational diseases and occupational related diseases, Occupational Hazards.	10
2	Occupational optometry, role of optometrist in industry, Steps involved in occupational optometry services, Visual task analysis, Ocular injuries, Electromagnetic radiations, visual functions for different occupations, Vision standards, Personal protective equipment, Lighting and occupation, Contact lens for various occupations.	10
3	Case studies on visual health in various occupations.	10

PRACTICALS:

1. Perform visual task analysis
2. Industrial Vision Screening – Modified clinical method and Industrial Vision test

PRACTICE MANAGEMENT

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: M Optom with experience of running private clinical services or Management professional with masters' qualification in Management

COURSE DESCRIPTION: This course deal with all aspects of optometry practice management – business, accounting, taxation, professional values, and quality & safety aspects.

COURSE OBJECTIVES: At the end of the course, student would have gained knowledge on various aspects of private optometric practice from Indian perspective.

TEXTBOOK:

L. S. Thal, S. Quintero, *Business aspects of Optometry*, 3rd edition - Association of Practice Management Educators – Butterworth Heinemann Elsevier, USA, 2010

"Curriculum of Optometry (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare)."

REFERENCE BOOKS:

1. I. Bennett, *Optometric Practice Management*, 2nd edition, Butterworth Heinemann, 2003

2. A. Hanks, *What Patients want?* AJ Hanks & VJ Hanks, 2010

3. N. Gailmard, *Practice management in optometry*, Walnut Ridge Publishing, 2017.

PREREQUISITES: Basic Clinical experience

COURSE PLAN

Unit	Topics	Hours
1	Business Management: Practice establishment and development, Stock control and costing, Staffing and staff relations, Business computerization	10
2	Accounting Principles: Sources of finance, Bookkeeping and cash flow. Taxation and taxation planning	10
3	Professionalism and Values: Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality. Personal values- ethical or moral values. Attitude and behaviour- professional behaviour, treating people equally. Code of conduct, professional accountability and responsibility, misconduct. Differences between professions and importance of team efforts Cultural issues in the healthcare environment	10

COMMUNITY EYE HEALTH AND TELE OPTOMETRY

CL	CP	L	P
1	2	15	60

Instructor in charge: M Optom with adequate experience in planning and delivery community eye health projects**.**

Course description

The course would help students apply theories taught in the public health and epidemiology course. The basic principles of public health, Ten Commandments of screening, screening of specific eye health ailments, data collection, data management and technical and non-technical reporting of the screenings conducted will be emphasized.

Students will be posted in community outreach activities of the organization. Students will get hands-on experience in handling community eye health programmes including school eye screening programs, adult comprehensive eye examination, cataract screening etc.

Objectives

- Learn the principles and commandments of Screening
- Develop relevant IEC materials and deliver them at the campsites
- Develop and conduct surveys to understand the practices and knowledge of stakeholders
- Learn the cost analysis pertaining to community outreach
- Learn Implementation and evaluation of a community outreach program

TEXT BOOK

1. Newcomb RD, Jolley JL: Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980

2. K Park: Park's Text Book of Preventive and Social Medicine, 19th edition, Banarsidas Bhanot publishers, Jabalpur, 2007

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COURSE PLAN

Unit	Topics	Hours
1	Epidemiology of blindness – Defining blindness and visual impairment. Prevalence, incidence and distribution of visual impairment. Eye in primary health care. Community Eye Care Programs	5
2	Nutritional Blindness with reference to Vitamin A deficiency. Screening for eye diseases – Refractive errors, Low Vision, Cataract, Diabetic retinopathy, Glaucoma, Amblyopia, Squint. National and International Agencies - NPCB, IAPB, WHO.. Role of an optometrist in Public Health. Optometrists role in school eye health programmes	5
3	Basics of Tele Optometry and its application in Public Health. Information, Education and Communication for Eye Care programs. Health Information and Basic Medical Statistics. Communication for Health Education. Health Planning and Management. Plan and implement 2030 INSIGHT	5

CL	CP	L	P
1	0.5	15	15

DATA SCIENCE FOR HEALTHCARE

Instructor in charge: M Optom with adequate experience and knowledge of big data, data science and health informatics**.**

Description

This course offers a systematic introduction to the scope and contents of health data arising from public health and the biomedical sciences. It focuses on rules and techniques for handling health data. Through both regular lectures and guest lectures, this course covers a broad range of health data.

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Learning Objectives

- To understand the foundation and rules for handling big health data
- To develop a practical knowledge and understanding of important statistical issues and relevant data analytics for health big data analysis
- To learn and master basic software and programming skills for data cleaning and data processing

TEXT BOOK: Faculty can decide

COURSE PLAN

Unit	Topics	Hours
1	Foundations of data science: Probability and statistics, Linear algebra for data science, Optimisation for data science	5
2	Health care systems, types of data in healthcare Healthcare data literacy Health care data security, compliance and privacy	5
3	Machine learning: foundations and algorithms, Machine learning and real world use: cases in biology and health care, disease modelling, Applications and benefits of data science	5

CLINICAL OPTOMETRY VIII

CL	CP	L	P
2	4	30	120

The course is the final series of seven directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship. This course will also offer a systematic introduction to the scope and framework to keep us up-to-date and examine the knowledge we use and the treatment and management recommendations we make.

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COURSE PLAN:

Unit	Topic	Hours
1	Evidence Based Practice on the following Common Clinical Conditions Convergence insufficiency/ Divergence excess Post refractive surgery Optic atrophy Retinal Detachment	15
2	Evidence Based Practice on the following Common Clinical Conditions Retinitis pigmentosa, CSNB, Stargardt's Disease Age related macular Degeneration Diabetic retinopathy Hypertensive Retinopathy	15

PRACTICALS:

1. Comprehensive eye examination
2. Community out-reach (Screening camps, Awareness camps and impact assessments for children, adult and geriatric population and occupation specific camps)
3. Neuro-optometric work up
4. Ocular surface work up
5. Cornea work up
6. Glaucoma work up
7. Uvea work up

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RESEARCH PROJECT- II

Instructor in charge: M Optom with experience in handling research projects

CL	CP	L	P
0	4	0	120

Course description

Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Students will get the experience of doing research in a systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing and presentation.

Objectives

· To acquire the basic knowledge and experience of collecting necessary data for the research topic

· To demonstrate an understanding of the relevant roles and responsibilities involved

· To conduct basic statistical analysis on the collected data

· To consolidate and report the results collected

TEXT BOOKS AND REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: All core Optometry courses.

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Ninth and Tenth Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis and management. Students will demonstrate competence in beginning, intermediate, and advanced procedures in above areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction.

The students are expected to work for minimum 7 hours per day and this may be more depending on the need and the healthcare setting.

Internships postings can be in the following locations: Eye Hospitals, Eye clinics in general hospital, Independent eye clinics, Optometric clinics in eye hospitals, general hospitals or optical showrooms, wherein the learning objective can be achieved. Short period of observation to eye care (instruments, optical, contact lens) related manufacturing set-ups, corporates and nongovernmental organizations. It is mandatory to provide exposure to all the outlined types of clinical postings as below.

S No	TYPE OF CLINICAL POSTINGS	DETAILS	Weightage based on clinical hours	Minimum No. of cases
1	OPD	General OPD Specialty OPD	30% 15%	650
2	Specialty Clinics	CL LVC BVC Opticals Diagnostics: (Covering all specialty including Corneal, retinal, cataract etc)	10% 10% 10% 10% 5%	20 10 10 100* 50
3	Community Rotations	School eye screening, Adult screening, Occupational Optometry etc.	10%	10 camps

Weightage and the number of cases are decided based on the number of weeks per year (48) and six working days and a minimum of 5 independent cases/ day for the OPD.

*Opticals postings: Scientific dispensing in cases of single vision, bifocals, progressives and specialty lenses (a minimum of 25 each) should be covered.

Faculty are encouraged to utilize modalities of teaching that are relevant to the health care professions for the lecture hours during internship. Emphasis on Evidence based practice should be considered. One such model is outlined here:

Vertical integration in the context of medical curricula can be defined as the integration of basic knowledge such as basic science and clinical science including skills, in the clinical context. In the current discipline-based curriculum, the teaching and learning of the clinical component takes place in clinics in the traditional design of teaching. The basic knowledge such as anatomy, physiology or biochemistry are not related with the clinical condition during patient care. This lack of integrating knowledge could be bridged by introducing the concept of vertical integration wherein the facilitators take the role of introducing the cases and the students take the major role of gathering knowledge and understand the clinical scenario and apply the basic knowledge till the patient management based on evidence. Here the subject is introduced with a case and the study materials are provided to the students well in advance for them to prepare for the class (group discussions and not Regular one way lecture). Here the students have greater opportunity of structured learning.

Assessments

Internship will be assessed using continuous and final assessments

- Continuous Assessments
- Logbook
- One Case Report each month
- Attendance
- Evaluations at the end of each specialty/diagnostic posting
- Mid Semester Clinical Evaluation - One Full Workup to be evaluated by an Optometrist
- End Semester Clinical Evaluation
- Written Examination (MCQ/Case-based covering topics from all the courses)
- One Full Workup to be evaluated by an Optometrist
- Clinical & Diagnostics reports interpretation
- Specialty Optometry Clinics(BVC, LVC, CL, Dispensing) Evaluation
- Viva Voce

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Skills based outcomes and monitorable indicators for Optometrist

First year:

1. Role play
2. Clinical Observations
3. Vision Check
4. Basic Lensometry
5. Basic Life Skills

Second year:

1. History taking
2. CEVS practical
3. Refraction Hands On including optical dispensing
4. Clinical Observations
5. Vision screening camps

Third Year:

1. Clinical Observation
2. Hands-on under senior optometrists
3. Case reporting
4. Case discussion
5. Vision screening camps
6. Diagnostic interpretations

Fourth year:

1. Clinical Observation
2. Hands-on under senior optometrists
3. Case reporting
4. Case discussion
5. Vision screening camps
6. Diagnostic interpretations

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Internship:

1.	Primary Eye Care	25 %
2.	Dispensing Optics	25 %
3.	Contact Lens	10%
4.	Low Vision Aids	10%
5.	Orthoptics	10%
6.	Diagnostics	10 %
7.	Anterior Segment clinic	5%
8.	Posterior Segment Clinic	5%

UG Log book:

The table below outlines the minimum number of procedures required/suggested to be documented in the record note book for each semester. Between the 5th and 8th semesters, students should aim to complete approximately half (50%) of the recommended patient cases, all of which must be recorded in a logbook. Moreover, during the internship, it's essential to maintain a separate log book, adhering to the guidelines specified in the aforementioned table (page 135).

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
I Year 1st Semester CLINICAL OPTOMETRY - I	Role Play (Patient-Optometrist)	3 cases	
	Organising an optometry practice clinic		
	Illumination, measurements and setting up of an Optometry Practice Clinic		
I Year 2nd Semester CLINICAL OPTOMETRY - II	Clinical Observation and Report writing	6 cases	
	Vision Check (Snellen's Chart) – Distance + Near	12 cases	
	Lensometry (Spherical lenses)		
II Year 1st Semester CLINICAL OPTOMETRY - III	History taking • General • Specific • Conditions	9 cases	Can practice on the following complaints : Blurred Vision, Headache, Pain, redness, Watering, Flashes, Floaters, Blackspots
	Lensometry	100 cases	Simple Sphere, Simple cylinder, Spherocylinder (90, 180, Oblique degrees), Bifocals, PAL

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
	Vision Check (log MAR) Pinhole acuity	100 cases	Simulation, especially to show and ask the students to interpret the findings.
	Extraocular Motility	10 cases	
	Cover test	10 cases	Video output Simulation of various conditions
	Alternate Cover test	10 cases	Video output Simulation of various conditions
	Hirschberg test	10 cases	Video output Simulation of various conditions
	Modified Krimsky test	3 cases	Video output Simulation of various conditions
	Push up test (Amplitude of Accommodation)	10 cases (1 case in presbyopic age)	
	Push up test (Near point of Convergence)	10 cases	
	Stereopsis test	10 cases	
	Tear Break up time	10 cases	
	Amsler's Grid test	10 cases (simulate)	Simulation of various conditions
	Photostress test	10 cases (Normals)	

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
	Color vision test	10 cases	
	Schirmer's test	10 cases	
	Confrontation test	10 cases	
II Year 2nd Semester CLINICAL OPTOMETRY - IV	Retinoscopy- Static, Dynamic and Cycloplegic Retinoscopy	25 + 25 +25 cases	Model eye for retinoscopy.
	Keratometry	25 cases	
	Subjective Refraction JCC Clock Dial Duochrome Borish Delayed	25 cases	
	Addition calculation	25 cases	Give more simulated problems and discuss on it
III Year 1st Semester CLINICAL OPTOMETRY -V	Slit lamp illumination	3 cases	
	Slit lamp examination	10 cases	
	Finger tension	10 cases (Normals)	
	Applanation Tonometry	10 cases (Normals)	
	Negative Relative Accommodation	10 cases	

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
	Positive Relative Accommodation	10 cases	
	von Herick Grading of Anterior chamber depth	10 cases	
	Accommodative facility(± 2.00 D)	10 cases	
	Corneal Sensitivity test	10 cases	
	IPD	10 cases	
	Proptosis evaluation	1 demo	Video demonstration of cases
	Ptosis evaluation	1 demo	Video demonstration of cases
	Pupillary evaluation -Direct -Consensual -RAPD	10 cases	
	HVID	10 cases	
	Maddox rod (Phoria)	10 cases	
	Negative Fusional vergence	10 cases	
	Positive Fusional Vergence	10 cases	
III Year 2nd Semester CLINICAL OPTOMETRY - VI	Direct ophthalmoscope	10 cases (Normals)	Show slides of various commonly seen retinal conditions

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
	Visual Field chart interpretation	10 cases – discussion	Both kinetic and Static
	B scan Interpretation	5 cases – discussion	
	A scan chart Interpretation	10 cases – discussion	Discussion having different types of wave patterns
	Case Analysis	10 cases	
	+90 D lens	10 cases (Normals)	Slides of various Cup: Disc ratios can be shown
IV Year 1st Semester CLINICAL OPTOMETRY - VII	Gonioscopy	5 cases (Normals)	Slides of abnormal angles
	Posting in optometry clinics	5+5+5+5+10 cases	Pediatric/contact lens/Low vision/ Orthoptics/ GOPD
	Camps	4 camps	School screening, Cataract
	IDO (on each other)	10 cases(Normals)	Slides of abnormal fundus
	Case Analysis	5+ 5+ 5+ 5 cases	Pathology Binocular Vision Clinical Refraction Dispensing optics

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
IV Year 2nd Semester CLINICAL OPTOMETRY – VII	Gonioscopy	5 cases (Normals)	Slides of abnormal angles
	Posting in optometry clinics	5+5+5+5+10 cases	Pediatric/contact lens/Low vision/ Orthoptics/ GOPD
	Camps	4 camps	School screening, Cataract
	IDO (on each other)	10 cases(Normals)	Slides of abnormal fundus
	Case Analysis -	5+ 5+ 5+ 5 cases	Pathology Binocular Vision Clinical Refraction Dispensing optics
V year **CLINICAL INTERNSHIP**	General OPD (History taking –DO)	5 cases (Normals)	
	Contact Lens	20 cases (5 RGP+ 5 Soft + 5 toric)	Totally 3 different case reports submission at the end of the postings
	Opticals	100 cases	Weekly 1 case report submission
	Low Vision care Clinic	10 cases	Totally 3 different case reports submission at the end of the postings

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Semester	Procedures	Minimum Number (Mandatory requirements) *	Comments
	Binocular Vision clinic	10 cases	Totally 3 different case reports submission at the end of the postings
	General OPD (Common eye conditions)	50 cases	Totally 3 different case reports submission at the end of the postings
	Camps	10 camps	Camp report submission

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CURRICULUM MAPPING & CREDIT MANAGEMENT

Credits and Assessments Outline

First Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP101	General Anatomy	3	0.5	3.5	45	15	60	30	70	100
BOP102	General Physiology	3	0.5	3.5	45	15	60	30	70	100
BOP103	General Biochemistry	3	0.5	3.5	45	15	60	30	70	100
BOP104	Physical Optics	3	0.5	3.5	45	15	60	30	70	100
BOP105	Mathematics & Geometrical Optics-I	3	0.5	3.5	45	15	60	30	70	100
BOP106	Introduction to Optometry[#]	2		2	30		30	100	-	100
BOP107	Nutrition[#]	1		1	15		15	100	-	100
BOP108	Communication[#]	1	2	3	15	60	75	100	-	100
BOP109	Clinical Optometry I[#]		1	2		30	30	100	-	100
Total		**19**	**5.5**	**255**	**285**	**165**	**450**	**550**	**350**	**900**

Non-university exams

"Curriculum of Optometry (Intellectual Property of the National Commission for Allied and Healthcare Professions, Ministry of Health and Family Welfare)."

Second Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP201	General Pharmacology	3		3	45		45	30	70	100
BOP202	General Pathology	2		2	30		30	30	70	100
BOP203	Ocular and related neuroanatomy	3	0.5	3.5	45	15	60	30	70	100
BOP204	Ocular and related neurophysiology	3	1	4	45	30	75	30	70	100
BOP205	Ocular Biochemistry	3	1	4	45	30	75	30	70	100
BOP206	Geometrical Optics-II	3	1	4	45	30	75	30	70	100
BOP207	Basics of Computers[#]		1	1		30	30	100	-	100
BOP208	Clinical Optometry-II[#]		2	2		60	60	100	-	100
Total		**17**	**6.5**	**23.5**	**255**	**195**	**450**	**380**	**420**	**800**

Non-university exams

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Third Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP301	General and Ocular Microbiology	3	0.5	3.5	45	15	60	30	70	100
BOP302	Ocular Pharmacology	3		3	45		45	30	70	100
BOP303	Visual optics –I	3	1	4	45	30	75	30	70	100
BOP304	Optometric optics	3	1	4	45	30	75	30	70	100
BOP305	Ocular Disease –I	3		3	45		45	30	70	100
BOP306	Indian Medicine and Telemedicine[#]	2		2	30		30	100	-	100
BOP307	Clinical Optometry-III		4	4		120	120	30	70	100
Total		**17**	**6.5**	**23.5**	**255**	**195**	**450**	**280**	**420**	**700**

Non-university exams

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Fourth Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP401	Optometric Instruments	3	0.5	3.5	45	15	60	30	70	100
BOP402	Clinical examination of visual system	1	2	3	15	60	75	30	70	100
BOP403	Visual perception and psychophysics	2	0.5	2.5	30	15	45	30	70	100
BOP404	Visual Optics-II	3	1	4	45	30	75	30	70	100
BOP405	Ocular Disease –II	3		3	45		45	30	70	100
BOP406	Behavioural Health Medical Psychology #	1		1	15		15	100	-	100
BOP407	Introduction to Quality & Patient safety #	1		1	15		15	100	-	100
BOP408	Clinical Optometry-IV		4	4		120	120	30	70	100
Total		**14**	**8**	**22**	**210**	**240**	**450**	**380**	**420**	**800**

Non-university exams

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Fifth Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP501	Systemic Disease	2		2	30		30	30	70	100
BOP502	Dispensing Optics	2	1	3	30	30	60	30	70	100
BOP503	Geriatric Optometry	3		3	45		45	30	70	100
BOP504	Paediatric Optometry	3	0.5	3.5	45	15	60	30	70	100
BOP505	Diagnostics and therapeutics of Anterior Segment diseases	4	0.5	4.5	60	15	75	30	70	100
BOP506	Innovation and technology #	1	0.5	1.5	15	15	30	100	-	100
BOP507	Clinical Optometry V	2	4	6	30	120	150	30	70	100
Total		**17**	**6.5**	**23.5**	**255**	**195**	**450**	**280**	**420**	**700**

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Sixth Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP601	Contact lens –I	2	1	3	30	30	60	30	70	100
BOP602	Low Vision care and Rehabilitation	2	1	3	30	30	60	30	70	100
BOP603	Binocular Vision- I	2	1	3	30	30	60	30	70	100
BOP604	Diagnostics and therapeutics of Posterior segment diseases	4	0.5	4.5	60	15	75	30	70	100
BOP605	Optometry and Multidisciplinary aspects of Health #	1		1	15		15	100	-	100
BOP606	Research Methodology & Biostatistics #	2		2	30		30	100	-	100
BOP607	Clinical Optometry VI	2	4	6	30	120	150	30	70	100
Total		**15**	**7.5**	**22.5**	**225**	**225**	**450**	**350**	**350**	**700**

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Seventh Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP701	Contact Lens –II	2	1	3	30	30	60	30	70	100
BOP702	Binocular Vision –II	2	1	3	30	30	60	30	70	100
BOP703	Public Health & Epidemiology	2		2	30		30	30	70	100
BOP704	Law and professional ethics – Optometry. #	1		1	15		15	100	-	100
BOP705	Community eye health #		1.5	1.5		45	45	100	-	100
BOP706	Clinical Optometry VII	2	4	6	30	120	150	30	70	100
BOP707	Research Project – I #		3	3		90	90	100		100
Total		**9**	**10.5**	**19.5**	**135**	**315**	**450**	**420**	**280**	**600**

Non-university exams

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Eighth Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP801	Occupational Optometry	2	0.5	2.5	30	15	45	30	70	100
BOP802	Practice Management	2		2	30		30	30	70	100
BOP803	Community eye health and Tele-optometry #	1	2	3	15	60	75	100	-	100
BOP804	Data science for healthcare #	1	0.5	1.5	15	15	30	100	-	100
BOP805	Clinical Optometry VIII	2	4	6	30	120	150	30	70	100
BOP806	Research Project – II		4	4		120	120	30	70	100
Total		**8**	**11**	**19**	**120**	**330**	**450**	**320**	**280**	**600**

Non-university exams

Ninth and tenth Semester (Considering 24 weeks per semester)

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
BOP901	B Optom Internship				50	1150	1200	50	-	50
BOP1001	B Optom Internship				50	1150	1200	50	-	50
Total		**0**	**0**	**0**	**100**	**2300**	**2400**	**100**	**-**	**100**

Non-university exams

PS:

- Distribution of marks for Internal and External assessments will be based on the credit distribution of the theory and practical for the courses. For eg. If a course has 3 credits for Lecture and 0.5 credits for Practicals, 25 marks for theory and 5 marks for practical will be considered for internal assessments out of the 30 marks. Similar ratios will be followed for External assessments.
- For Practical examinations, an internal and external examiner will assess the candidates. All examinations will align with the IELOCS document

Research Project Guidelines

The candidate is required to submit a project under the guidance of an Optometry faculty member during the 7th and 8th semesters. The project may encompass a case study, examination of recent techniques, literature reviews, or similar endeavours aimed at fostering a research-oriented mind set and preparing for further academic pursuits.

All students are mandated to maintain comprehensive records of their research project activities, which must be verified and endorsed by the supervising Optometry faculty member. Subsequently, based on these records and the completed project, students are expected to present their work during the university exam for final assessment.

Internship guidelines

Candidates applying for entry to the internship period must have successfully passed all examinations in all subjects, demonstrating attainment of the total credits required for the Programme.

Duration: The internship spans a period of 12 months, inclusive of assignments in rural, Community Based camps (CBR), or similar setups.

During the internship, candidates are obligated to engage in full-time work, averaging 7 hours per day on each working day, for 6 days a week, over the course of 12 calendar months. Each candidate is entitled to a maximum of 12 holidays throughout the entirety of the Internship Programme, apart from the one day weekly off. In the event of any exigencies necessitating the candidate's absence for a period exceeding 6 days, the candidate is obliged to compensate by working additional days to cover the absence.

Stipend: An appropriate nominal amount shall be paid as stipend for the intern students. This should be revised periodically.

Assessment: Interns are required to maintain detailed records of their work, subject to verification and certification by the Head of the Department under whose supervision they operate. In addition to scrutinizing the work records, the Head of the Department conducts assessments and evaluations of the interns' training, encompassing aspects such as attendance, discipline, knowledge, skills, and attitude throughout the training period. Assessment reports are subsequently forwarded to the parent institution.

Upon review of the work records and assessment data, the Director or Principal shall issue a "Certificate of Satisfactory Completion of Training." This certificate serves as the basis for the University to award the Bachelor of Optometry Degree or declare the candidate eligible for the same.

In the event of an unsatisfactory assessment report, the intern in question will be required to repeat the internship for a duration determined by the relevant Head of the Institution.

Interns are expected to adhere to all rules and regulations established by the Institution or Hospital where they are assigned.

Interns are personally responsible for the proper use of equipment within the Institute or Hospital where they are stationed. Any damages resulting from improper use will incur liability for the intern to cover repair or replacement costs.

Extension of Internship Duration: The Principal or Director may extend the duration of the internship under specific circumstances, including prolonged absence exceeding the permitted leave period, unsatisfactory performance, or disciplinary issues.

Infrastructure Requirements: Institutions must ensure the availability of satisfactory infrastructure facilities for Optometry training sites. Guidelines suggest:

- The institution conducting the Optometry Programme must possess a fully equipped Optometry clinic in accordance with the curriculum.
- Optometry sections within Institutes or Hospitals should feature all necessary infrastructure facilities.
- Senior Optometrists with significant clinical experience must oversee Optometry departments.
- The Director or Principal may grant a No Objection Certificate (NOC) for internships conducted at alternative locations, provided that the respective Hospital meets the aforementioned criteria. Candidates must submit details regarding Optometry services available at their chosen internship site to obtain NOC.

Upon the conclusion of the internship, it is mandatory for all students to successfully pass the clinical examination administered by the university/college. Upon satisfactory completion of this clinical examination, the university will confer the degree upon the candidate.

4.2 Master of Optometry

Master of Optometry

Eligibility for admission:

Bachelor of Optometry or equivalent from a recognised university with minimum 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.

Total hours –2355 (including clinical and research)

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.

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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Master of Optometry [2 year programme]

Proposed Scheme

Year	Semester	Credits	Hours
1	1	24.5	525
1	2	22	510
2	3	28	630
2	4	28	690
Total		**102.5**	**2355**

Credit details:

One credit implies one hour lecture per week or two hours of laboratory/practical per week or two hours of clinics per week or two hours of Research project per week

A semester is considered to have 15 weeks. For example,

1 credit course = 15 hours of lectures per semester

3 credits course = 45 hours of lectures per semester

0.5 credit course = 15 hours of practical/laboratory per week

CL	CP	L	P
3	0.5	45	15

CL: Credit for Lecture

CP: Credit for Practicals

L: Hours for Lecture

P: Hours for Practicals

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Curriculum Outline

First Semester

Sl. No.	Course Titles	Hours/semester		
		Lecture	Practical	Total
MOP101	Applied ocular biology	45		60
MOP102	Advanced Ocular Diagnostics & Management	45		60
MOP103	Research Methodology and Biostatistics	30		60
MOP104	Intellectual property rights[#]	30		60
MOP105	Research Project-1[#]	45		60
MOP106	Digital pedagogy and learning management[#]	15	15	30
MOP107	General Clinics-1		120	15
MOP108	Specialty Optometry Clinics-1		120	45
MOP109	Community Outreach-1		60	60
TOTAL		210	315	525

#Non-University Exams

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Second Semester

Sl. No.	Course Titles	Hours/semester		
		Lecture	Practical	Total
MOP201	Specialized clinical optometry-Contact Lens-1	30		30
MOP202	Specialized clinical optometry-Low Vision Care	30		30
MOP203	Elective 1#	30		30
MOP204	Research Project-2#	60		60
MOP205	General Clinics-2		180	180
MOP206	Specialty Optometry Clinics-2		120	120
MOP207	Community Outreach-2		60	60
	TOTAL	150	360	510

#Non-University Exams

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Third Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practical	Total
MOP301	Specialized clinical optometry-Contact Lens – 2	30		30
MOP302	Specialized clinical optometry-Binocular Vision	30		30
MOP303	Specialized clinical optometry-Rehabilitation	30		30
MOP304	Elective 2#	30		30
MOP305	Scientific communication #	30		30
MOP306	Research Project-3	60		60
MOP307	General Clinics-3		180	180
MOP308	Specialty Optometry Clinics-3		180	180
MOP309	Community Outreach-3		60	60
TOTAL		210	420	630

#Non-University Exams

Fourth Semester

Sl. No.	Course Titles	Hours per semester		
		Lecture	Practical	Total
MOP401	Specialized clinical optometry - Vision Therapy and Neuro Optometry	30		30
MOP402	Elective 3#	30		30
MOP403	Research Project-4	90		90
MOP404	General Clinics-4		240	240
MOP405	Specialty Optometry Clinics-4		240	240
MOP406	Community Outreach-4		60	60
TOTAL		150	540	690

#Non-University Exams

Assessment:

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.

Clinical subjects MOP107, MOP108, MOP109, MOP205, MOP206, MOP207, MOP307, MOP308, MOP309, MOP404, MOP405, MOP406 need to follow the assessment pattern given below:

a. Case Evaluation Exercise (CEX) MUST be done in each speciality with patients in the clinic.
b. "Speciality related worksheet" need to be used for assessment of clinical skills using rubrics.
c. Written Examination (MCQ/Case-based covering topics from all the courses)
d. One Full Workup to be evaluated by an Optometrist
e. Clinical & Diagnostics reports interpretation
f. Specialty Optometry Clinics(BVC, LVC, CL, Dispensing) Evaluation
g. Viva Voce

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First Semester

APPLIED OCULAR BIOLOGY

CL	CP	L	P
3	0	45	0

INSTRUCTOR IN CHARGE: A postgraduate or PhD in basic sciences with relevant exposure to optometry.

COURSE DESCRIPTION: This course is designed to give the learners an overview about the basic science of the eye and clinical relevance. Applications of concepts in the basic biomedical sciences such as Anatomy, Physiology, Biochemistry, Microbiology, Genetics, Immunology, and Pathology will be discussed in the context of General physiology as well as ocular and clinical conditions.

OBJECTIVES: At the end of the semester, the student should be able to:

1. Explain ocular anatomy, and physiology of visual system relevant to eye and vision care
2. Demonstrate an understanding of genetics, microbial infections of the eye and ocular pathology relevant to ocular science
3. Gain knowledge about cell biology and ocular biochemistry, immunology, the basics of pharmacology and ocular pharmacology relevant to ocular science.

TEXT BOOK AND REFERNCE BOOK:

J. V. Forrester, A. D. Dick, P. G. Mcmenamin, Fiona Roberts, Eric Pearlman, The Eye: Basic Science in Practice, 4/e., Elsevier. 2016

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PREREQUISITES: Ocular Anatomy and Physiology, Biochemistry, Microbiology, Genetics, Immunology and Pathology

COURSE PLAN:

Unit	Topic	Hours
1	Anatomy of Eye and Orbit: Osteology of orbit, Orbital contents – Extra Ocular Muscles- Blood vessels of the orbit – Cranial Nerves associated with eye and orbit –Ocular Adnexa – Muscle of eye lids and adjacent face - Anatomy of the visual pathway. Physiology of Vision and the Visual System: Light detection and Dark adaptation – Visual acuity and contrast Sensitivity – Clinical Visual Electrophysiology – Color vision – Monocular versus Binocular vision – Ocular movement: Physiology – Psychophysical basis for clinical tests	15
2	Genetics: Chromosome and Cell division –Molecular genetics– Clinical Genetics –Population genetics–Gene cell differentiations and Cell based therapy: Molecular genetics and ophthalmology Microbial Infections of the Eye: Introduction: Microbes in the environment - Host defense at the ocular surface: Physical barriers – Adaptive immunity to microbial infection – Ocular infections worldwide: viral, Bacterial, fungal, protozoan infections of the eye – Ocular infections in developing countries. Pathology: Introduction – Cell and Tissue damage, Mechanism of cell death – Inflammation –Neoplasia – Hamartomas – Choristomas – Teratoma –Tumors	15
3	Biochemistry: Biochemistry of the ocular surface, tear film, lacrimal gland sections, mucus layer, the conjunctiva, the lids , cornea and sclera, uveal tract- Inborn errors of metabolism and the eye, Metabolic diseases General and Ocular Pharmacology: Introduction - Pharmacokinetics– Pharmacodynamics –Mechanism of ocular drug absorptions –Routes of administration – Delivery methods - Drug Vehicles - Advanced ocular delivery systems – Ocular toxicity from systemic administrations of drugs Immunology: Innate and Acquired immunity – Initial response of the host to injury – Acute and Chronic Inflammation – Development of adaptive immunity and immunological memory – Organization of immune system – Antigen recognition – T cell activation – The eye and the immune system	15

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ADVANCED OCULAR DIAGNOSTICS AND MANAGEMENT

CL	CP	L	P
3	0	45	0

INSTRUCTOR IN CHARGE: A postgraduate or PhD in basic sciences with relevant exposure to optometry.

COURSE DESCRIPTION: This course is designed to provide exposure to diagnostics to ocular conditions and management options for ocular diseases.

OBJECTIVES: At the end of the course the student will be able to:

1. Interpret the findings for diagnostics of ocular diagnostics
2. Demonstrate an understanding on management options for ocular diseases
3. Gain knowledge about management options for ocular diseases

TEXT BOOK AND REFERENCE BOOK:

1. Nicholas R Galloway, Common Eye Diseases and their management 3rd Edition.
2. Amar Agarwal. (2011) Diagnostic and Imaging techniques in Ophthalmology.

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PREREQUISITES: Ocular Anatomy and Physiology, Ocular Diseases, Optometric Instrumentation

COURSE PLAN:

Unit	Topics	Hours
1	Ocular photography: External, Anterior (Slit lamp and Gonio photography), Posterior (Fundus Photography, Fundus Autofluorescence, Fundus Fluorescein Angiography, Indocyanine Green Angiography) Ultrasonography: (Ultrasound biomicroscopy, A-scan ultrasonography, B-scan ultrasonography, Pachymetry) Ocular Surface: (Meibography, Keratography, Corneal Biomechanics)	10
2	Anterior Segment Diagnostics: Confocal Microscopy, Specular microscopy, Corneal Topography, Corneal Tomography, Anterior Segment Optical Coherence Tomography, Pentacam, Aberrometry	10
3	Posterior Segment Diagnostics: Posterior Segment Optical Coherence Tomography (Spectral Domain OCT, Swept Source OCT, OCT Angiography), Ocular Electrodiagnostics (ERG, MfERG, VEP, EOG), Dark Adaptometry	10
4	Clinical management of ocular conditions: Overview of drugs used in treatment of ocular disease, Overview of laser and surgical interventions for ocular disease, Vertical Integration of all treatment options of ocular disease with special emphasis on optometric management	15

RESEARCH METHODOLOGY AND BIOSTATISTICS

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: Biostatistician/Epidemiologist or Higher optometry holder with experience in biostatistics and research methodology

COURSE DESCRIPTION: The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

OBJECTIVES: At the end of the course, the student should be able to:

1. Apply the basic concepts in research
2. Choose appropriate study designs based on the research question
3. Use statistical tools to test for normality, pair-wise, and multiple comparisons, correlations and non-parametric tests
4. Apply and demonstrate Regression analysis
5. Utilise the concepts on qualitative research and analyse questionnaire development

TEXT BOOK:

1. Research methodology: methods and techniques (C R Kothari), New age international publishers

2. W. W. Daniel, C. L. Cross. Biostatistics: A Foundation for Analysis in the Health Science, 10/e., Wiley, 2013

REFERENCE BOOKS:

3. B. Rosner. Fundamentals of Biostatistics, 7/e, Duxbury Resource Center, 2010.

4. R. F. Woolson, W. R. Clarke. Statistical Methods for the Analysis of Biomedical Data 2/e., John Wiley, New Jersey 2011.

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PREREQUISITES: Basic Biostatistics and Epidemiology.

COURSE PLAN

Unit	Topics	Hours
1	Introduction to research methods, research strategies, Clinical study designs, sampling methods and sample size, tests for significance, association and causation. Ethics in research, Critical review of literature and consolidation, Writing a research question, Planning and implementing a research project, Data handling	7
2	Sampling and sample size, Sampling distributions: t, chi-square, F distributions; Hypothesis testing: null and alternative hypotheses, decision criteria, critical values, type I and type II errors, Meaning of statistical significance; Power of a test; One sample hypothesis testing: Normally distributed data: z, t and chi-square tests; Binomial proportion testing. Tests for normality, comparison of 2 means, comparison of proportions - demonstration with statistical tools.	8
3	Two sample hypothesis testing; Nonparametric methods: signed rank test, rank sum test; Kruskal-Wallis test; Analysis of variance. Comparison of multiple groups, ANOVA, multivariate modelling, Correlation - demonstration with statistical tools, Non-parametric tests, Mann-Whitney test, Kruskal Wallis, Friedman, Wilcoxon signed rank test - demonstration with statistical tools	8
4	Confounding and Bias, Regression – simple linear, logistic regression, multiple regression – demonstration with statistical tools. Qualitative research and questionnaire development.	7

INTELLECTUAL PROPERTY RIGHTS

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: Lawyer or Higher optometry holder with experience in medical law and practice

COURSE DESCRIPTION: The course is designed to introduce fundamental aspects of Intellectual Property Rights to learners who are going to play a major role in development and management of innovative projects. The course is designed for increasing awareness among a multidisciplinary audience.

OBJECTIVES: At the end of the semester, the student should be able to:

1. Analyse various aspects of copyrights and geographical indications
2. Analyse various aspects of patents and Infer aspects of industrial designs
3. Examine various aspects of trademark, and apply the knowledge about the enforcement of intellectual property rights

TEXT BOOK AND REFERENCE BOOKS:

1. T. M. Murray, M. J. Mehlman. Encyclopedia of Ethical, Legal and Policy Issues in Biotechnology, Vol 2, John Wiley & Sons, 2010.
2. P. N. Cheremisinoff, R. P. Ouellette, R. M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. 1985.
3. D. Balasubramaniam, C. F. A. Bryce, K. Dharmalingam, J. Green, K. Jayaraman, Concepts in Biotechnology, 3/e University Press. 2004.
4. B. David, T. R. Jewell, R. G. Buiser, Biotechnology: Demystifying the Concepts1/e., Wesley Longman, USA, 2000.
5. Parulekar, S. D'Souza, Indian Patents Law – Legal & Business Implications, Macmillan India ltd. 2006.
6. L. Wadehra. Law Relating to Patents, Trademarks, Copyright, Designs & Geographical Indications, Universal law Publishing Pvt. Ltd., 2000.
7. P. Narayanan, Law of Copyright and Industrial Designs, 4/e., Eastern law House, Delhi. 2010.

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PREREQUISITES: Medical law and Ethics.

COURSE PLAN

Unit	Topics	Hours
1	COPYRIGHT: What is copyright? What is covered by copyright? How long does copyright last? Why protect copyright? RELATED RIGHTS: What are related rights?, Distinction between related rights and copyright?, Rights covered by copyright? GEOGRAPHICAL INDICATIONS: What is a geographical indication? How is a geographical indication protected? Why protect geographical indications?	10
2	PATENTS: Patent and kind of inventions protected by a patent, Patent document, How to protect your inventions? Granting of patent, Rights of a patent, How extensive is patent protection?, Drafting and Filing of a patent. INDUSTRIAL DESIGNS: What is an industrial design? How can industrial designs be protected? What kind of protection is provided by industrial designs? How long does the protection last? Why protect industrial designs?	10
3	TRADEMARKS: What is a trademark? Rights of trademark?, What kind of signs can be used as trademarks?, How is a trademark protected?, How is a trademark registered?, How long is a registered trademark protected for? Trade secrets and know-how agreements. ENFORCEMENT OF INTELLECTUAL PROPERTY RIGHTS: Infringement of intellectual property rights, Enforcement Measures	10

RESEARCH PROJECT - I

INSTRUCTOR IN CHARGE: M Optom with experience in handling Research Projects

CL	CP	L	P
3	0	45	0

COURSE DESCRIPTION:

This course aims to enable the learner to appreciate the theoretical concepts learnt on the basics of research and apply it to initiate a research and propose an action plan. It would also prepare the learner to seek permissions from the relevant research bodies.

During the course the learner is expected to decide on a research topic after discussion with the respective guides, perform a thorough literature review, attend periodic journal clubs, interact with peers, faculty and guide, prepare a review of literate through presentation, formulate the methodology after discussion with the guide and plan and present for approval from the Institutional Review Board and ethics Committee.

OBJECTIVE:

Upon completion of this course, the learner will be able to:

1. Critically review and summarize literature
2. Propose a work plan
3. Arrange for obtaining approvals from the IRB and Ethics committee

DIGITAL PEDAGOGY AND LEARNING MANAGEMENT

CL	CP	L	P
1	0.5	15	15

INSTRUCTOR IN CHARGE: Academician or Higher optometry holder with adequate experience in teaching students

COURSE DESCRIPTION: This course aims to train the learner to understand the means of ICT integration into teaching and learning and demonstrate the different forms of digital information in the appropriate context.

OBJECTIVES: At the end of the semester, the student should be able to:

1. Demonstrate and understand the various learning techniques
2. Compare various teaching methods, Review teaching methods and feedback techniques.
3. Appreciate the potentials of instructional multimedia

TEXT BOOK:

1. J. A. Dent, R. M. Harden, A Practical Guide for Medical Teachers, 3/e., Churchill Livingstone, 2009.
2. T. M. Srinivasan, Use of Computers and Multimedia in Education. Horton, 2002.
3. M. D. Williams, Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, 2000.
4. S. K. Mangal, Advanced educational psychology PHI Learning private Ltd., 2006

COURSE PLAN:

Unit	Topic	Hours
1	Curriculum: Types of curricula- subject centered, learner centered curriculum, problem-based curriculum, competency/ outcome based curriculum and its importance Learning and changing behaviour: Learning: nature, characteristics of learning -Theories of learning: classical and operant conditioning. System's Approach, Principles of adult learning, Learning process Learning taxonomy- Bloom's taxonomy for cognitive domain, Krathwohl's affective domain taxonomy, Dave's Taxonomy for skill domain Learning objectives: Program objectives, course and unit objectives, framework the learning objectives, SMART objectives, horizontal and vertical integration of objectives.	4
2	Types of learners: Visual, auditory, Readers and kinaesthetic learners. Designing of teaching learning activities- Use the system's approach for instructional design, Learner centric system, developing a lesson plan and material for using active learning methods for a course. Teaching learning methods such as: a. Didactic lectures, b. Small group teaching methods, c. Large group teaching methods, d. Case based and problem based learning, e. Simulations, f. Team based learning, g. Flipped classroom, h. Use of technology/ multimedia in teaching, i. Bed side / chair side teaching, clinical rotations, j. Reflective practice, k. Inter-professional education, l. Skill development, m. Project based learning, n. Self-directed learning (SDL)	5

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3	Assessment in higher education: Principles of assessment, planning for assessment, summative and formative assessments, performance indicators, various assessment tools such as: a. Long answer questions, b. Short answer questions, c. Multiple choice questions, d. Objective Structured Clinical Examination (OSCE), e. Objective Structured practical Examination (OSPE), f. Direct Observation of Procedural Skills (DOPS), g. Mini-Clinical Evaluation Exercise (Mini-CEX), h. Long Case Examination, i. Portfolios, j. Assignments- written/ oral, k. Self-assessment and peer assessment. Assessment reports and feedback: types of feedbacks, importance, reflective practice Evidence based teaching. ICT: Definition, Meaning, Scope, Trends and significance in the context of Education, ICT for Effective Teaching and Learning, ICT in classroom, ICT for Professional Development. Role of AIR in Education, Gyanvani, Countrywide Classroom, EDUSAT: Implications, ETV, Network. Evaluation of multimedia learning materials.	6

PRACTICALS:

1. Frame the learning objectives course/program
2. Design an instructional module for given learning objective
3. Deliver teaching session using active learning methods
4. Mentor the undergraduates to develop their knowledge and clinical skills
5. Design a feedback questionnaire, collect and analyse the feedback for teaching conducted in classroom/clinics

GENERAL CLINICS I

CL	CP	L	P
0	4	0	120

COURSE OBJECTIVE: This course aims to expose the learner to different specialty out-patient departments and general clinics to provide comprehensive optometric care.

CLINICAL POSTINGS:

1. General OPD/ Emergency
2. Glaucoma OPD
3. Neuro OPD
4. Pediatric OPD
5. Uvea OPD
6. Vitreoretina OPD
7. Cornea OPD
8. Community OPD

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES: Upon completion of this course, the learners will be able to:

1. Appreciate the diversities pertaining to the ocular problems among patients presenting to the hospital
2. Handle the patients with their applied knowledge

SPECIALTY OPTOMETRY CLINICS - I

CL	CP	L	P
0	4	0	120

COURSE OBJECTIVE: This course aims is to expose the learner to different optometry specialty clinics and diagnostic specialties to equip the learner correlate, assimilate the findings related to their research area of interest.

CLINICAL POSTINGS:

1. Binocular Vision / Vision therapy clinic
2. Low Vision Clinic
3. Contact lens Clinic
4. Refraction / Myopia control clinic
5. Occupational Optometry Clinic

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DIAGNOSTIC POSTINGS:

1. Glaucoma Diagnostics (UBM, ASOCT, Visual Fields, OCT)
2. Retina Diagnostics (OCT, FFA, B Scan, Electro diagnostics)
3. Cornea Diagnostics (ASOCT, Pentacam, Topography, Abberometer)

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Gain exposure to different optometric specialty clinics and diagnostic specialties and able to interpret the test results
2. Utilize and translate the knowledge from these specialty clinics to their research avenues

COMMUNITY OUTREACH SERVICES-I

CL	CP	L	P
0	2	0	60

COURSE OBJECTIVE: This course aims to expose the learners to the outreach activities whereby the learner would appreciate the needs of the society, be responsive to the needs and make the learner socially accountable.

Learners will offer services in the community outreach initiatives of the academic/ clinical institution for the specific hours in the semester. They will maintain a logbook of the services rendered and submit a case report of cases seen during the community activities in a specified format. The evaluation will be based on the number of hours of outreach services, logbook maintenance and case reports.

COMMUNITY OUTREACH POSTINGS:

1. School Eye Screening
2. Screening for Adults (Comprehensive adults eye screening camps, Cataract screening camps, Camps for elderly, Camps for differently abled, etc.)

Second Semester

SPECIALIZED CLINICAL OPTOMETRY – CONTACT LENS 1

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: A postgraduate or PhD in Contact lens with adequate clinical exposure in contact lens clinics.

COURSE DESCRIPTION: Upon completion of the course, the student should be able to understand the fitting for soft and RGP contact lenses along with the management of ocular complications.

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

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 like protective and therapeutic lenses

TEXT BOOK/REFERENCE BOOKS:

1. IACLE Modules
2. Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006

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PREREQUISITES: Ocular diseases**,** Basic Contact Lens

COURSE PLAN

Unit	Topics	Hours
1	Anatomy and Physiology of the Cornea and related Structures Tears and contact lenses	4
2	Optics and Lens Design Contact Lens Materials Clinical Instrumentation in contact lens practice	4
3	Soft contact lens fitting Toric Contact lens fitting	4
4	Rigid Gas Permeable corneal lens fitting Microbiology, Lens Care and Maintenance	4
5	Contact lens standards Lens checking : Soft and Rigid	4
6	Contact lens complications	4
7	Special types of Contact lenses – diagnosis, surgery, protective, therapeutic, sports, partially sighted	6

SPECIALIZED CLINICAL OPTOMETRY – LOW VISION

CL	CP	L	P
2	0	30	0

INSTRUCTOR INCHARGE: A postgraduate or PhD in Low vision/Rehabilitation with adequate clinical exposure in handling low vision clinic.

COURSE DESCRIPTION: This course gives both in-depth theoretical knowledge in Low vision care. Upon completion of the course, the student should have thorough understanding of the causes of the low vision, its functional and psychosocial consequences, and rehabilitation measures through didactic lectures.

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OBJECTIVES At the end of the course, students should be able to:

1. To understand the cause and needs of low vision patient
2. To suggest and guide patients with appropriate low vision devices (Optical/Non-optical)
3. To understand basic rehabilitation and refer in case of further need

TEXT BOOK:

1. B. Silverstone, Lighthouse Handbook on Vision Impairment and Vision Rehabilitation – Volume I and II. Oxford University press, 2000..

REFERENCE BOOKS:

1. Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998
2. Sarika G, Sailaja MVS, E Vaithilingam: Practice of Low vision –A guide book, Medical Research Foundation, 2015.
3. Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
4. Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
5. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

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PREREQUISITES: Ocular Diseases, Basic Low vision care

COURSE PLAN

Unit	Topics	Hours
1	Visual Disorders – Medical Perspective 1. The Epidemiology of Vision Impairment 2. Vision Impairment in the pediatric population 3. Ocular Diseases : Age – Related Cataract, Glaucoma, ARMD, Diabetic retinopathy, Corneal Disorders, Ocular Trauma, Sensory Neuro-ophthalmology and Vision Impairment, Refractive Disorders	5
2	Visual Disorders – The Functional Perspective 1. Low Vision and Psychophysics 2. Visual Functioning in Pediatric Populations with Low Vision 3. Perceptual correlates of Optical Disorders 4. Functional aspects of Neural Visual Disorders of the eye and Brain 5. Visual Disorders and Performance of specific Tasks requiring vision	5
3	Optical and Non-Optical device Field expanding systems and Assistive technology, Hand held minus lenses/reverse telescopes - optical principles, Reflecting mirrors, Use of Fresnel prisms, Peli lens model, Eccentric viewing training and Head Scanning Training, Computer software for visually impaired, Mobile software for visually impaired, Machines modified for helping visually impaired, perform activities of daily living without help, Large print items, auditory cues, Contrast Enhancement and Environmental modification	5

4	Visual Disorders – The Psychosocial Perspective 1. Developmental perspectives – Youth 2. Vision Impairment and Cognition 3. Spatial orientation and Mobility of people with vision impairments 4. Social skills Issues in vision impairment 5. Communication and language : Issues and concerns 6. Developmental perspectives on Aging and vision loss 7. Vision and cognitive Functioning in old age	5
5	Interactions of Vision Impairment with other Disabilities and sensory Impairments. 1. Children with Multiple Impairments 2. Dual Vision and Hearing Impairment 3. Diabetes Mellitus and Vision Impairment 4. Vision Problems associated with Multiple Sclerosis 5. Vision Impairment related to Acquired Brain Injury 6. Vision and Dementia 7. Low Vision and HIV infection	5
6	The Environment and Vision Impairment: Towards Universal Design 1. Indian Disabilities act 2. Children's Environments 3. Environments of Older people 4. Outdoor environments 5. Lighting to enhance visual capabilities 6. Signage and way finding 7. Accessible Environments through Technology Vision Enhancement Techniques: Optical and non-optical Vision Enhancement techniques	5

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ELECTIVE 1

CL	CP	L	P
2	0	30	0

COURSE DESCRIPTION: Students should choose any one of the following elective courses or a course relevant to their area of interest.

1. Recent theories in development and management of refractive errors.
2. Community Optometry
3. Geriatric eye care
4. Innovation and Technology
5. Eye care for Special population
6. Courses relevant to optometry as decided by the respective institute.

Course plan: Faculty/ Institute can decide the course plan keeping in mind the need for meeting the required credit hours in 15 weeks.

RESEARCH PROJECT - II

CL	CP	L	P
4	0	60	0

INSTRUCTOR IN CHARGE: M Optom with experience in handling

COURSE DESCRIPTION: This course aims to enable the learner to appreciate the approaches to data collection and complete data collection based on the approved methodology.

During the course the learner will utilize various concepts pertaining to data collection, decide on sample size and formulate a plan for completing collection of data. Learners would also apply the statistical tools to analyse the data and submit a report.

OBJECTIVE:

Upon completion of this course, the learners will be able to complete data collection, analyse critically and submit a report.

GENERAL CLINICS II

CL	CP	L	P
0	6	0	180

COURSE OBJECTIVE: This course aims to expose the learner to different specialty out-patient departments and general clinics to provide comprehensive optometric care.

CLINICAL POSTINGS:

1. General OPD/ Emergency
2. Glaucoma OPD
3. Neuro OPD
4. Pediatric OPD
5. Uvea OPD
6. Vitreoretina OPD
7. Cornea OPD
8. Community OPD

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES:

1. Upon completion of this course, the learners will be able to:
2. Appreciate the diversities pertaining to the ocular problems among patients presenting to the hospital
3. Handle the patients with their applied knowledge

SPECIALTY OPTOMETRY CLINICS - II

CL	CP	L	P
0	4	0	120

COURSE OBJECTIVE: This course aims is to expose the learner to different optometry specialty clinics and diagnostic specialties to equip the learner correlate, assimilate the findings related to their research area of interest.

CLINICAL POSTINGS:

1. Binocular Vision / Vision therapy clinic
2. Low Vision Clinic
3. Contact lens Clinic
4. Refraction / Myopia control clinic
5. Occupational Optometry Clinic

DIAGNOSTIC POSTINGS:

1. Glaucoma Diagnostics (UBM, ASOCT, Visual Fields, OCT)
2. Retina Diagnostics (OCT, FFA, B Scan, Electro diagnostics)
3. Cornea Diagnostics (ASOCT, Pentacam, Topography, Abberometer)

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

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LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Gain exposure to different optometric specialty clinics and diagnostic specialties and able to interpret the test results
2. Utilize and translate the knowledge from these specialty clinics to their research avenues

COMMUNITY OUTREACH SERVICES-II

CL	CP	L	P
0	2	0	60

COURSE OBJECTIVE: This course aims to expose the learners to the outreach activities whereby the learner would appreciate the needs of the society, be responsive to the needs and make the learner socially accountable.

Learners will offer services in the community outreach initiatives of the academic/ clinical institution for a specific hour in the semester. They will maintain a logbook of the services rendered and submit a case report of cases seen during the community activities in a specified format. The evaluation will be based on the number of hours of outreach services, logbook maintenance and case reports.

COMMUNITY OUTREACH POSTINGS:

1) School Eye Screening

2) Screening for Adults (Comprehensive adults eye screening camps, Cataract screening camps, Camps for elderly, Camps for differently abled, etc.)

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Third Semester

SPECIALIZED CLINICAL OPTOMETRY-CONTACT LENS 2

CL	CP	L	P
3	1	45	30

INSTRUCTOR INCHARGE: A postgraduate or PhD in Contact lens with adequate clinical exposure in contact lens clinics.

COURSE DESCRIPTION: Upon completion of the course, the student should be able to understand the contact lens fitting for compromised corneas and keratoconus. The student should also be able to understand the fitting philosophy of orthokeratology and myopia control.

OBJECTIVES: At the end of the course, the student will be able to:

1. Fit contacts lenses with all specialized contact lenses
2. Fit prosthetic contact lenses
3. Fit contact lens for paediatric group
4. Fit occupational contact lenses
5. Troubleshoot contact lenses related queries
6. Outline the available products available in the market and the sources
7. Understand the legalities to dispense contact lenses

TEXT BOOK:

1. IACLE Modules
2. Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006

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PREREQUISITES: Specialized Clinical Optometry- Contact Lens 1

COURSE PLAN:

Unit	Topics	Hours
1	Introduction to advanced contact lens Microbiology and immunology in relation to contact lens wear, Pharmacology of contact lens solution; review of contact lens solution contents. Contact lens complications; causes and management and patho-physiology. Identification of lens deposits. Trouble shooting in CL related problems	2
2	Ability to fit specialized contact lenses: Keratoconus, Rose-K lenses, Mini scleral lenses, Hybrid lenses, Orthokeratology, Scleral lenses: Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia	12
3	Contact lens prescription in different scenarios: Bifocal and Multifocal contact lenses, Ability to fit custom made ocular prosthesis, Cosmetic and prosthetic contact lens fitting, Ability to fit paediatric contact lenses, Ability to fit contact lens post PK and refractive surgery	8
4	Ability in fitting contact lenses in different occupations and Practice Management Fitting considerations for sports and special situations. Contact lens in different occupation. Advancements in contact lens industry, contact lens instrumentation and techniques, Products oriented design and material characteristics, setting up your practice - Law and Practice Management.	8

SPECIALIZED CLINICAL OPTOMETRY-BINOCULAR VISION

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: A post-graduate or an optometrist with adequate clinical exposure in handling binocular vision clinic.

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COURSE DESCRIPTION: This course is designed to provide the learners an exposure to advanced issues in managing binocular vision anomalies using vision therapy. The learners will be introduced to diagnosis and treatment of sensory-motor disorders of binocular vision, including strabismus, amblyopia, and general binocular dysfunction, special conditions like Accommodative Spasm/ Pseudomyopia, learning related vision problems, sensory-motor issues related to acquired brain injury, their optometric evaluation and Optometrist's role in these issues.

OBJECTIVES: Upon completion of this course, students will be able to

1. Define the concept related to basics of binocular vision, and interactions between accommodation and Vergence through clinical testing
2. Relate the development of the eye and visual system, and its implications to binocular vision anomalies; Perform a comprehensive Binocular vision assessment and arrive at appropriate diagnosis
3. Define and analyze various types of strabismus, clinical characteristics, effects of visual deprivation, amblyopia, oculomotor control and disruptions, nystagmus and perform appropriate clinical testing for the same
4. Explain the relationship between vision and learning and relate it to visual perceptual assessment, and acquired brain injury
5. Formulate a hierarchical vision therapy protocol for non-strabismic binocular vision dysfunctions and amblyopia

TEXT BOOK:

1. M. Scheiman, B. Wick, Optometric Management of Learning Related Vision Problems, 2/e., Mosby Inc, 2006.
2. L. J. Press, Applied Concepts in Vision Therapy, St. Louis: Mosby. 2008.
3. M. Scheiman, B. Wick, Clinical Management of Binocular Vision – Heterophoric, Accommodative, and eye movement disorders, 4/e., Lippincott Williams & Wilkins 2014.
4. S. Cotter, Clinical Uses of Prism: A Spectrum of Applications, 1/e., Mosby. 1995.
5. E. Ong, K. J. Ciuffreda, Accommodation, Nearwork, and Myopia. Optometric Extension Program. 1997.
6. G. B. Erickson, Sports Vision: Vision Care for the Enhancement of Sports Performance Butterworth-Heinemann, 2007.

ONLINE RESOURCES

1. Clinical Practice Guidelines of AOA on Care of the patient with Accommodative and Vergence dysfunction (CPG – 18)
https://www.aoa.org/documents/optometrists/QRG-18.pdf
2. Care of the patient with amblyopia (CPG – 4)
https://www.aoa.org/documents/optometrists/QRG-4.pdf
3. Care of the patient with strabismus (CPG – 12)
https://www.aoa.org/documents/optometrists/QRG-12.pdf
4. Care of the patient with paediatric eye and vision examination (CPG 2)
https://www.aoa.org/documents/optometrists/CPG-2.pdf•

JOURNALS

1. Optometry (Journal of the American Optometric Association)
2. Journal of Behavioural Optometry
3. Journal of Learning Disabilities
4. Optometry and Vision Development (COVD Journal)
5. Optometry and Vision Science
6. Behavioural Optometry (Australia)

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PREREQUISITES: Ocular Diseases, Basic Binocular Vision

COURSE PLAN:

Unit	Topics	Hours
1	Introduction 1. Basics concepts related to binocular vision – brief refreshment 2. Normal development of visual system 3. Interaction between accommodation and vergence 4. Understanding binocular vision anomalies 5. Clinical assessments involved in identifying binocular vision anomalies	8
2	Strabismus, Esodeviations, Exodeviations, Vertical deviations, types and clinical characteristics, accommodative and non-accommodative etiologies, oculomotor signs of disorders of the central nervous system,Assessment of optical and visual function in human infants. Refraction and refractive error in infants and children, Effects of visual deprivation. Amblyopia, types and clinical features of Nystagmus.	8
3	Concepts of Binocular Vision and neural systems: Relationship between vision and learning, visual processing development, Visual information processing and visual perceptual disorders. Parallel pathways for vision, dorsal, ventral streams, mirror neuron system, cerebral vision impairment, acquired brain injury, learning related vision problems, tests for visual perception, Test of Developmental Eye Movements, Test of Visual Perceptual Skills, Beery-Buktenica Visual Motor Integration, Wold Sentence Copy, Piaget Left-Right, Gardner Reversal Frequency, Birch-Belmont Auditory-Visual Integration, binocular vision assessment in sports vision	6
4	Introduction to vision therapy concepts 1. Vision therapy equipment 2. Formulating a Vision Therapy Protocol – Hierarchical sequencing 3. Vision therapy: In-office and Home 4. Accommodation, 5. Vergence	8

	6. Oculomotor dysfunctions 7. Amblyopia 8. Recent advancements in vision therapy 9. Use of Optical aids in Vision Therapy 10. Lenses, prisms, and mirrors, 11. Free space and instrument training, 12. Paper and pencil techniques	

SPECIALIZED CLINICAL OPTOMETRY-REHABILITATION

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: A post-graduate or an optometrist with adequate clinical exposure in handling rehabilitation services.

COURSE DESCRIPTION: This course aims to provide the learners both in-depth theoretical knowledge and clinical exposure in rehabilitation. The course enables the learner to understand the nature of the rehabilitation, its functional and psychosocial consequences of rehabilitation measures.

OBJECTIVES: At the end of the course, the student should be able to:

1. Define different approaches to rehabilitation and can able to recite the available laws in relation to rehabilitation
2. Assess the psychology of the patients and understand the social and psychological limitations in relation with the rehabilitation approach
3. Outline various available rehabilitation methods and resources for children
4. Outline various available rehabilitation methods and resources for adults and elderly

TEXTBOOK AND REFERENCE BOOKS:

1. Silverstone, Lighthouse Handbook on Vision Impairment and Vision Rehabilitation – Volume I and II. Oxford University press, 2000.

2. Dickinson. Low Vision – Principles and Practice, Butterworth Heinemann, 2002.

3. M. V. S. Sailaja, G. Sarika, E. Vaithilingam, Practice of Low Vision Care Guide for Eye Care Professionals, 2/e., Sankara Nethralaya, 2015.

4. R. T. Jose, Understanding Low Vision, American Foundation for the Blind, 1994.

5. A. H. Lueck, Functional Vision: A Practitioner's Guide to Evaluation and Intervention, AFB Press, 2004

PREREQUISITES: Ocular diseases and Low vision care

COURSE PLAN:

Unit	Topics	Hours
1	Introduction and Legal aspects in Rehabilitation 1. Introduction to Rehabilitation: In western, in Asia and Personnel preparation for rehabilitations 2. Concept of Rehabilitation 3. Availability and Limitations in current medical treatments and the need for visual rehabilitation with respect to Indian Scenario, 4. Legal aspects of rehabilitation: Right to Persons with Disabilities act (2016), other related legal aspects and amendments towards betterment of visual challenged	5
2	Psychological and social factors in visual Adaptation and Rehabilitation 1. The Role of psychosocial Factors in adaptation to vision Impairment and rehabilitation outcomes for Children and Youth 2. The Role of psychosocial Factors in adaptation to vision Impairment and rehabilitation outcomes for Adults and Older adults 3. Social support and adjustment to vision Impairment across the life span 4. The person – Environment perspective of vision impairment 5. Associated Depression, Disability and rehabilitation 6. Methodological strategies and issues in social research on vision Impairment and rehabilitation	5
3	Rehabilitation for children Functional Vision evaluation of Infants, Educational assessment of visual function in Children, Classroom environment and academic activities, Support as an Optometrist, Early intervention in infants with low vision / Vision stimulation, Different types of schooling, Mainstreaming the child with visual impairment, Integrated/Inclusive modes of education, Holistic approach in visual Rehabilitation, Environmental modification at home and office, Performing basic activities of daily living, Available vocations / Vocational training / Independent living skills, Disability concessions for the visually impaired / Social security	10

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4	Rehabilitation for adults: Holistic approach in visual Rehabilitation, Environmental modification at home and office, Performing basic activities of daily living, Available vocations / Vocational training / Independent living skills, Disability concessions for the visually impaired / Social security, Job placement according to the educational qualification, Orientation and Mobility training, Independent living skills including cooking, cleaning, sweeping, ADL Rehabilitation of older Adults with Vision Impairment: Environmental modification at home, Performing basic activities of daily living, Disability concessions for the visually impaired, social and financial security	10

ELECTIVE II

CL	CP	L	P
2	0	30	0

COURSE DESCRIPTION: Students should choose any one of the following elective courses or a course relevant to their area of interest.

1. Advanced Ocular Disease (Retina, Glaucoma, Cornea)
2. Teaching Assitance-1
3. Occupational Optometry
4. Orientation and Mobility
5. Data science
6. Ophthalmic Genetics and Genetic Counselling
7. Course relevant to optometry as decided by the respective institute.

Course plan: Faculty/ Institute can decide the course plan keeping in mind the need for meeting the required credit hours in 15 weeks.

SCIENTIFIC COMMUNICATION

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: A postgraduate or doctorate in the field of communication

COURSE DESCRIPTION: This course gives a comprehensive introduction to the learners that will help them create effective scientific communication along with preparation of technical documents.

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OBJECTIVES: At the end of the course, the student should be able to:

1. Relate to the purpose and infer about an audience, and show ethical issues of technical communication, Outline key aspects, build on conducting interviews and surveys
2. Plan and compose a technical proposal, approach to review board and ethics committee
3. Identify important aspects of visual technical communication and utilize it
4. Determine significant aspects of oral technical communication and plan for giving effective oral presentations
5. Identifying and effectively choosing the mode of communication to communicating with peers

TEXTBOOK AND REFERENCE BOOK:

H. Graves, R. Graves, A Strategic Guide to Technical Communication, 2/e, Broad view press, 2012.

PREREQUISITES: Basic Communication skills

COURSE PLAN:

Unit	Topics	Hours
1	Audience, purpose and Genre – technical communication, linking purpose and audience, Ethical issues of technical communication – Ethical writing and its relation to technical communication, Interviewing and conducting surveys – Preparation and reporting the outcomes, Visual technical communication - Visuals for effective communication, guidelines for preparing and giving presentations	10
2	Proposal Writing: Research Proposals, Grant Proposals, Approvals from Review Boards and Ethics Committee, Dissertation writing and Manuscript writing: Consolidating the literature, addressing reviewer comments	10
3	Oral technical communication - Common speaking occasions, formal and informal presentations, guidelines for preparing and giving presentations, Communicating to peers: Defense/ VIVA voce, Letter to editors, view point articles, guest editorials, Media and social network - Communicating scientific content to the public	10

RESEARCH PROJECT - III

CL	CP	L	P
4	0	60	0

INSTRUCTOR IN CHARGE: M Optom with experience in handling

COURSE DESCRIPTION: This course aims to enable the learner to appreciate the theoretical concepts learnt on the basics of research and apply it to initiate a research and propose an action plan. It would also prepare the learner to seek permissions from the relevant research bodies.

During the course the learner is expected to collect data, clean, code and analyse data, write a dissertation report till results and discussion. Student should attend periodic journal clubs, interact with peers, faculty and guide and plan for publication of the work in discussion with the respective guides.

OBJECTIVE:

Upon completion of this course, the students will be able to:

1. Collect data and analyse
2. Present the results in relevant formats like tables and figures
3. Write the dissertation report
4. Plan for a manuscript writing

GENERAL CLINICS III

CL	CP	L	P
0	6	0	180

COURSE OBJECTIVE: This course aims to expose the learner to different specialty out-patient departments and general clinics to provide comprehensive optometric care.

CLINICAL POSTINGS:

1. General OPD/ Emergency
2. Glaucoma OPD
3. Neuro OPD
4. Pediatric OPD
5. Uvea OPD
6. Vitreoretina OPD
7. Cornea OPD
8. Community OPD

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

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LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Appreciate the diversities pertaining to the ocular problems among patients presenting to the hospital
2. Handle the patients with their applied knowledge

SPECIALTY OPTOMETRY CLINICS - III

CL	CP	L	P
0	6	0	180

COURSE OBJECTIVE: This course aims is to expose the learner to different optometry specialty clinics and diagnostic specialties to equip the learner correlate, assimilate the findings related to their research area of interest.

CLINICAL POSTINGS:

1. Binocular Vision / Vision therapy clinic
2. Low Vision Clinic
3. Contact lens Clinic
4. Refraction / Myopia control clinic
5. Occupational Optometry Clinic

DIAGNOSTIC POSTINGS:

1. Glaucoma Diagnostics (UBM, ASOCT, Visual Fields, OCT)
2. Retina Diagnostics (OCT, FFA, B Scan, Electro diagnostics)
3. Cornea Diagnostics (ASOCT, Pentacam, Topography, Abberometer)

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Gain exposure to different optometric specialty clinics and diagnostic specialties and able to interpret the test results

2. Utilize and translate the knowledge from these specialty clinics to their research avenues

COMMUNITY OUTREACH SERVICES-III

CL	CP	L	P
0	2	0	60

COURSE OBJECTIVE: This course aims to expose the learners to the outreach activities whereby the learner would appreciate the needs of the society, be responsive to the needs and make the learner socially accountable.

Learners will offer services in the community outreach initiatives of the academic/ clinical institution for a specific hour in the semester. They will maintain a logbook of the services rendered and submit a case report of cases seen during the community activities in a specified format. The evaluation will be based on the number of hours of outreach services, logbook maintenance and case reports.

COMMUNITY OUTREACH POSTINGS:

1) School Eye Screening

2) Screening for Adults (Comprehensive adults eye screening camps, Cataract screening camps, Camps for elderly, Camps for differently abled, etc.)

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Fourth Semester

SPECIALISED CLINICAL OPTOMETRY – VISION THERAPY, NEURO-OPTOMETRY

CL	CP	L	P
2	0	30	0

INSTRUCTOR IN CHARGE: A postgraduate or PhD in Optometry and vision science with relevant exposure to general and various specialty clinics particularly binocular vision, paediatric optometry and vision therapy.

COURSE DESCRIPTION This course is designed to provide the learners an exposure to advanced issues in binocular vision and its management. The learners will be introduced to diagnosis and treatment of sensory-motor disorders of binocular vision. The course will also provide advanced training to the learners in Neuro-Optometry and Neuro-Optometric vision therapy, evaluating patients with Traumatic brain injury and Cerebrovascular Accidents such as Stroke, and cranial nerve paresis. The course will help to understand the specialized evaluation protocols and Neuro-optometric rehabilitation.

OBJECTIVES: At the end of the course, the student will be able to:

1. To formulate a hierarchical vision therapy protocol for non-strabismic binocular vision dysfunctions, amblyopia
2. To apply the knowledge of Neuro-anatomical pathways for the control of eye position and movement
3. To discuss the evaluation and treatment of Visual field loss and visual spatial neglect, evaluation of Visual and vestibular system in Traumatic brain injury, Egocentric localization, management for altered visual adaptation in ABI
4. To discuss the various vision rehabilitation techniques in Brain Injury.

TEXT BOOK AND REFERENCE BOOK:

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

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PREREQUISITES: Ocular Diseases, Paediatric Optometry, Binocular Vision, Low Vision

COURSE PLAN:

Unit	Topics	Hours
1	Vision therapy equipment, formulating a Vision Therapy Protocol – Hierarchical sequencing, vision therapy for accommodation, vergence and oculomotor dysfunctions, lenses, prisms, and mirrors, free space and instrument training, paper and pencil techniques, vision therapy for amblyopia, recent advancements in Vision Therapy	15
2	Anatomy of the visual cortex, pathway for vision, pupils, and eye movements, Structure and function of the early visual pathway including retinal ganglion cells, optic nerves, lateral geniculate nucleus and visual cortex. Taking history and understanding neuro-ophthalmic emergencies, visual loss of uncertain origin, Neuro-optometric assessment	6
3	Neuro-anatomical pathways for the control of eye position and movement; gaze holding, image stabilization and tracking eye movement systems; oculomotor signs of disorders of the central nervous system (palsies, nystagmus, opthalmoplegia, cog-wheel pursuits, saccadic dysmetria); the near visual-motor response and the synergistic coupling of accommodation and convergence; binocular misalignment (heterophoria and fixation disparity, Visual and vestibular system in Traumatic brain injury (TBI), diplopia assessment, Hess, Diplopia charting, assessment of reading, Readalyzer, Vision rehabilitation in brain injury, training in compensatory scanning, Prisms and its applications. Interdisciplinary management and rehabilitation	9

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ELECTIVE III

CL	CP	L	P
2	0	30	0

COURSE DESCRIPTION: Students should choose any one of the following elective courses or any course relevant to their area of interest.

1. Innovations in Ocular diagnostics
2. Teaching Assistance-2
3. Sports Optometry
4. Quality of life assessment and patient reported outcomes.
5. Non-optical refractive management
6. Health economics

Course plan: Faculty/ Institute can decide the course plan keeping in mind the need for meeting the required credit hours in 15 weeks.

RESEARCH PROJECT - IV

CL	CP	L	P
6	0	90	0

INSTRUCTOR IN CHARGE: M Optom with experience in handling

COURSE DESCRIPTION: This course enables the learner to critically review, propose, plan, implement and judge an appropriate research idea into reality, discuss on the results and conclude decisions based on the work. During the course, the learner will complete data collection, analyse the data and conclude, understand the scope and limitations of the work and present a complete report. Learner will also have periodic discussions with the guide and incorporate the discussion agenda into the research work.

OBJECTIVE:

Upon completion of this course, the learner will be able to:

1. To use appropriate strategy to clean and code the collected data
2. To use suitable statistical methods to present results
3. To complete research from the initial steps of problem identification to the final outcome
4. To submit a dissertation on their relevant research interest area
5. To defend the work to vision scientists, clinicians and public
6. To submit a manuscript in indexed journal.

GENERAL CLINICS IV

CL	CP	L	P
0	8	0	240

COURSE OBJECTIVE: This course aims to expose the learner to different specialty out-patient departments and general clinics to provide comprehensive optometric care.

CLINICAL POSTINGS:

1. General OPD/ Emergency
2. Glaucoma OPD
3. Neuro OPD
4. Pediatric OPD
5. Uvea OPD
6. Vitreoretina OPD
7. Cornea OPD
8. Community OPD

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Appreciate the diversities pertaining to the ocular problems among patients presenting to the hospital
2. Handle the patients with their applied knowledge.

SPECIALTY OPTOMETRY CLINICS - IV

CL	CP	L	P
0	8	0	240

COURSE OBJECTIVE: This course aims is to expose the learner to different optometry specialty clinics and diagnostic specialties to equip the learner correlate, assimilate the findings related to their research area of interest.

CLINICAL POSTINGS:

1. Binocular Vision / Vision therapy clinic
2. Low Vision Clinic
3. Contact lens Clinic
4. Refraction / Myopia control clinic
5. Occupational Optometry Clinic

DIAGNOSTIC POSTINGS:

1. Glaucoma Diagnostics (UBM, ASOCT, Visual Fields, OCT)
2. Retina Diagnostics (OCT, FFA, B Scan, Electro diagnostics)
3. Cornea Diagnostics (ASOCT, Pentacam, Topography, Abberometer)

Each learner is expected to maintain clinic logbook, submit one case report per specialty as mentioned above and compulsorily attend all the weekly and special seminars.

LEARNING OUTCOMES:

Upon completion of this course, the learners will be able to:

1. Gain exposure to different optometric specialty clinics and diagnostic specialties and able to interpret the test results
2. Utilize and translate the knowledge from these specialty clinics to their research avenues

COMMUNITY OUTREACH SERVICES-IV

CL	CP	L	P
0	2	0	60

COURSE OBJECTIVE: This course aims to expose the learners to the outreach activities whereby the learner would appreciate the needs of the society, be responsive to the needs and make the learner socially accountable.

Learners will offer services in the community outreach initiatives of the academic/ clinical institution for the specific hours in the semester. They will maintain a logbook of the services rendered and submit a case report of cases seen during the community activities in a specified format. The evaluation will be based on the number of hours of outreach services, logbook maintenance and case reports.

COMMUNITY OUTREACH POSTINGS:

1) School Eye Screening

2) Screening for Adults (Comprehensive adults eye screening camps, Cataract screening camps, Camps for elderly, Camps for differently abled, etc.)

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Target cases for Semester -II

Speciality Clinics	No. of cases
Contact lens	
Rigid Contact lens fitting in simple refractive errors	5
Soft contact lens fitting in Simple Refractive errors	5
Bifocal fitting	3
Abnormal cornea	3
Cosmetic contact lens	5
Bandage lens fitting	2
prosthetic shell (Custom made)	2
Low Vision	
Low vision clinic	12
Low vision screening camp	1 camp
Integrated/Inclusive/Special school posting for a week period.	10
Case report – submission and presentations	
BV I	
Pediatric patient evaluation	12
Diagnosis and management of oculomotor problems	10
Amblyopia management	5
Management of special population	10
Community Optometry clinics	
Community eye care Hospitals/vision centers	10
Planning and conducting of Vision and Eye Screening	1 camp
Screening report writing	
Advanced Ocular Diagnostics	
Anterior segment Photography	10
Posterior segment Photography	10

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PG Log book:

The students are required to carry out the following cases on the patients, rather than merely observing them, and document their experiences in the log book. The specific number of cases to be recorded in the log book for each semester is provided below.

Target cases for Semester -III

Speciality Clinics	**No. of cases**
Contact Lens Clinics	
Scleral contact lens fitting	6
Orthokeratology	2
Post-refractive surgery	2
Post-keratoplasty fitting	4
Abnormal cornea	2
Cosmetic contact lens	Already done in previous sem. But while submitting at university students need to submit previous year cases
Bandage lens fitting	
Rigid Contact lens fitting in Simple refractive errors	
Soft contact lens fitting in Simple Refractive errors	
Bifocal fitting	
Community Optometry Clinics	
Community eye care Hospitals	10
Planning and conducting of Vision and Eye Screening	Planning of one Eye camp by each student.
Screening report writing.	Concerned student who has arranged the camp needs to submit the report
Low Vision Clinics	
Low vision clinic	12
Case report – submitting and presentations	

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Paediatric Clinics	
Paediatric patient evaluation	Refractive error subjects: 5 patients Anterior segment cases: 2 patients Posterior segment cases: 2 patients Lids and Adnexa (No. simple ptosis or NLD blocks): 2 patients
Diagnosis and management of oculomotor problems	Horizontal squints: 5 patients Vertical /oblique squints: 3 patients Sensory anomalies: 3 patients
Vision therapy	10
Amblyopia management	3
Management of special population	Already done in previous sem. But while submitting at university students need to submit previous year cases
Perceptual therapies	2
Neuro optometric rehabilitation	1
Advanced Ocular Diagnostics	
a.Topography/Pentacam/Orbscan	10
b. Specular microscopy	10
c. Pachymetry	10
d. Abberometry	10
e. AS OCT	10
f. UBM	10
g. Corneal Hysteresis	10
h. Pre- refractive procedures Work up.	10

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Target cases for Semester -IV

Speciality Clinics	No. of cases
Contact Lens Clinics	
Scleral contact lens fitting	3 eyes
Orthokeratology	2 eyes
Post-refractive surgery	2 eyes
Post-keratoplasty fitting	2 eyes
Community Optometry Clinics	
Community eye care Hospitals	10
Low Vision Clinics	
Low vision clinic	10
Case report – submitting and presentations	
Paediatric Clinics	
Diagnosis and management of oculomotor problems	Horizontal squints: 5 Vertical /oblique squints: 3 Sensory anomalies: 3
Vision therapy	10
Management of special population	
Perceptual therapies	2
Neuro optometric rehabilitation	1
Advanced Ocular Diagnostics	
Glaucoma Work-ups : VFA, OCT, Pachymetry, AT	10 each
Dry eye Work ups: TBUT, OSDI, Meibography, Schirmer test	10 each
Electro diagnostics	3 cases each: 10 cases over all ERG, EOG, VEP, PVEP, MFERG etc.

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Credits and Assessment Outline

First Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
MOP101	Applied ocular biology	3		3	45		45	30	70	**100**
MOP102	Advanced Ocular Diagnostics & Management	3		3	45		45	30	70	**100**
MOP103	Research Methodology and Biostatistics	2		2	30		30	30	70	**100**
MOP104	Intellectual property rights[#]	2		2	30		30	100	-	**100**
MOP105	Research Project-1[#]	3		3	45		45	50	-	**50**
MOP106	Digital pedagogy and learning management [#]	1	0.5	1.5	15	15	30	100	-	**100**
MOP107	General Clinics-1		4	4		120	120	30	70	**100**
MOP108	Specialty Optometry Clinics-1		4	4		120	120	30	70	**100**
MOP109	Community Outreach-1		2	2		60	60	30	70	**100**
Total		**14**	**10.5**	**24.5**	**210**	**315**	**525**	**430**	**420**	**850**

#Non-University Exams

Second Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
MOP201	Specialized clinical optometry-CL-1	2		2	30		30	30	70	**100**
MOP202	Specialized clinical optometry-LVC	2		2	30		30	30	70	**100**
MOP203	Elective 1[#]	2		2	30		30	100	-	**100**
MOP204	Research Project-2 [#]	4		4	60		60	50	-	**100**
MOP205	General Clinics-2		6	6		180	180	30	70	**100**
MOP206	Specialty Optometry Clinics-2		4	4		120	120	30	70	**100**
MOP207	Community Outreach-2		2	2		60	60	30	70	**100**
Total		**10**	**12**	**22**	**150**	**360**	**510**	**300**	**350**	**650**

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Third Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
MOP301	Specialized clinical optometry- CL-2	2		2	30		30	30	70	100
MOP302	Specialized clinical optometry- BV	2		2	30		30	30	70	100
MOP303	Specialized clinical optometry- Rehabilitation	2		2	30		30	30	70	100
MOP304	Elective 2 #	2		2	30		30	100	-	100
MOP305	Scientific communication #	2		2	30		30	100	-	100
MOP306	Research Project-3	4		4	60		60	30	70	100
MOP307	General Clinics-3		6	6		180	180	30	70	100
MOP308	Specialty Optometry Clinics-3		6	6		180	180	30	70	100
MOP309	Community Outreach-3		2	2		60	60	30	70	100
Total		**14**	**14**	**28**	**210**	**420**	**630**	**410**	**490**	**900**

#Non-University Exams

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Fourth Semester

Course code	Course Titles	Credits/Week			Hours/Semester			Assessments		Total
		L	P	C	L	T/P	Total	IA*	UE**	(IA+UE)
MOP401	Specialized clinical optometry- Vision Therapy, Neuro optometry	2		2	30		30	30	70	100
MOP402	Elective 3 #	2		2	30		30	100	-	100
MOP403	Research Project-4	6		6	90		90	30	70	100
MOP404	General Clinics-4		8	8		240	240	30	70	100
MOP405	Specialty Optometry Clinics-4		8	8		240	240	30	70	100
MOP406	Community Outreach-4		2	2		60	60	30	70	100
Total		**10**	**18**	**28**	**150**	**540**	**690**	**250**	**350**	**600**

#Non-University Exams

PS:

- Distribution of marks for Internal and External assessments will be based on the credit distribution of the theory and practical for the courses. For eg. If a course has 3 credits for Lecture and 0.5 credits for Practicals, 25 marks for theory and 5 marks for practical will be considered for internal assessments out of the 30 marks. Similar ratios will be followed for External assessments.
- For Practical examinations, an internal and external examiner will assess the candidates. All examinations will align with the IMLOCS document
- Research Project: An internal and external examiner will assess the candidates for the final evaluation. Optometrists with PhD (Preferably in the relevant disciplines of optometry) should be the examiner for assessment of research projects

Skills based outcomes and monitorable indicators for Optometrist

1. PATIENT HISTORY
    a. Communicates with the patient
        i. Modes and methods of communication are employed which take into account the physical, emotional, intellectual and cultural background of the patient
        ii. A structured, efficient, rational and comfortable exchange of information between the optometrist and the patient takes place
    b. Makes general observations of patient
    c. Obtains the case history
    d. Obtains and interprets patient information from other professionals

2. PATIENT EXAMINATION
    a. Formulates
        i. An examination plan based on the patient history is designed to obtain the information necessary for diagnosis and management
        ii. Tests and procedures appropriate to the patient's condition and abilities are selected.
    b. Implements examination plan
        i. Tests and procedures which will efficiently provide the information required for diagnosis are performed
        ii. The examination plan and procedures are progressively modified on the basis of findings
    c. Assesses the ocular adnexae and the eye
        i. The structure and health of the ocular adnexae and their ability to function are assessed
        ii. The structure and health of the anterior segment and its ability to function are assessed
        iii. The structure and health of the ocular media and their ability to function are assessed
        iv. The structure and health of the posterior segment and its ability to function are assessed.
        v. The nature of the disease state is determined
        vi. Microbiological tests are selected and ordered
    d. Assesses central and peripheral sensory visual function and the integrity of the visual pathways
        i. Vision and visual acuity are measured
        ii. Visual fields are measured
        iii. Colour vision is assessed
        iv. Pupil function is assessed

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e. Assesses refractive status
f. Assesses oculomotor and binocular function
    i. Eye alignment and the state of fixation are assessed
    ii. The quality and range of the patient's eye movements are determined
    iii. The status of sensory fusion is determined
    iv. The adaptability of the vergence system is determined
    v. Placement and adaptability of accommodation are assessed
g. Assesses visual information processing
    i. Visual perceptual abilities are assessed
    ii. Visual-motor integration is assessed
h. Assesses the significance of signs and symptoms found incidental to the ocular examination in relation to the patient's eye and/or general health
i. Pertinent non-ocular signs and symptoms found incidentally during the ocular examination are identified and considered
j. Ensures that significant non-ocular signs and symptoms are investigated

3. DIAGNOSIS
    a. Interprets and analyses findings to establish a diagnosis or diagnoses
    b. Accuracy and validity of test results and information from the case history and other sources are critically appraised
    c. Test results and other information are analysed, interpreted and integrated to establish the diagnosis or diagnoses

4. PATIENT MANAGEMENT
    a. Designs a management plan for each patient and implements the plan agreed to with the patient
    b. The diagnosis is presented and explained to the patient
    c. Consideration is given to the relative importance or urgency of the presenting problems and examination findings
    d. Management options to address the patient’s needs are explained
    e. A course of management is chosen with the patient, following counselling and explanation of the likely course of the condition, case management and prognosis
    f. The informed consent of the patient is obtained for the initiation and continuation of treatment
    g. Patients requiring ongoing care and review are recalled as their clinical condition indicates, and management is modified as indicated

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5. PRESCRIBES SPECTACLES
    a. The suitability of spectacles as a form of correction for the patient is assessed
    b. The patient's refraction, visual requirements and other findings are applied to determine the spectacle prescription

6. PRESCRIBES CONTACT LENSES
    a. The suitability of contact lenses as a form of correction for the patient is assessed
    b. The patient's refraction, visual requirements and other findings are applied to determine the contact lens prescription
    c. Therapeutic and cosmetic contact lenses are recommended and prescribed
    d. Contact lenses are correctly ordered and on receipt, parameters are verified before the lenses are supplied to the patient
    e. Contact lenses are checked on the eye for physical fitting and visual performance
    f. The patient is instructed in matters relating to ocular health and vision in contact lens wear, contact lens care and maintenance
    g. Contact lens performance, ocular health and patient adherence to wearing and maintenance regimen is monitored

7. PRESCRIBES LOW VISION DEVICES
    a. A range of low vision devices is demonstrated
    b. Low vision devices suited to the patient's visual requirements and functional needs are prescribed
    c. The patient is instructed in the use of the low vision device
    d. The success of the low vision device is evaluated and monitored and additional or alternative devices are prescribed
    e. The patient is informed of and, if necessary, referred to other rehabilitative services

8. PRESCRIBES PHARMACOLOGICAL TREATMENT REGIMENS
    a. Selects appropriate pharmacological agents for the treatment of the patient’s condition
    b. Microbiological factors are considered in the choice of therapeutic agent(s)
    c. Pharmacological factors are considered in the choice of therapeutic agent(s)
    d. Systemic factors are considered in the choice of therapeutic agent(s)
    e. Ocular factors are considered in the choice of therapeutic agent(s)
    f. Available delivery systems are considered in the choice of therapeutic agent(s)

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g. Drug substitution factors are considered in the choice of therapeutic agent(s)
h. Prescribes therapeutic drugs
i. Monitors and modifies treatment regimen
j. Instructs/counsels patient on the correct use of the prescribed drugs
k. Patients are instructed about precautionary procedures and non-therapeutic management

9. DISPENSES OPTICAL PRESCRIPTIONS ACCURATELY
   a. The prescription is interpreted and responsibility for dispensing is accepted
   b. The patient is assisted in selecting an appliance
   c. Lenses are ordered and fitted to spectacle frames in accordance with accepted standards
   d. The appliance is verified against the prescription prior to delivery
   e. 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

10. MANAGES PATIENTS REQUIRING VISION THERAPY
   a. Treats patients diagnosed with accommodative, vergence, strabismic and amblyopic conditions
   b. The patient is instructed in the use and maintenance of vision training equipment
   c. Goals of the vision therapy program and criteria for discharge are set
   d. Progress of the vision therapy program is monitored

11. TREATS OCULAR DISEASE AND INJURY
   a. Non-pharmacological treatment or intervention procedures are performed
   b. Pharmacological and/or other regimens are instituted and therapeutic devices are introduced to treat eye conditions
   c. The patient is instructed in the use, administration, storage and disposal of pharmaceutical agents
   d. The effect of treatment is monitored and changes in management are recommended

12. REFERS THE PATIENT
   a. The need for referral to other professionals for assessment and/or treatment is recognised and discussed with the patient.
   b. A suitable professional is recommended to the patient
   c. Timely referral, with supporting documentation, is made to other professionals
   d. Patients can be jointly managed with other health care practitioners

13. CO-WORK WITH OPHTHALMOLOGIST IN THE PROVISION OF PRE AND POST OPERATIVE MANAGEMENT OF PATIENTS
    a. Provides pre-operative assessment and advice
    b. Provides post-surgical follow-up assessment and monitoring of signs according to the surgeon's requirements and the procedure undertaken
    c. Provides emergency management for observed post-surgical complication
    d. Arranges appropriate referral for further post-operative treatment or assessment of complications

14. PROVIDES ADVICE ON VISION IN THE WORKPLACE
    a. Visual screenings for occupational or other purposes are provided
    b. Advice is provided on eye protection, visual standards and visual ergonomics in the workplace
    c. Individuals are counselled on the suitability of their vision for certain occupations
    d. Certification of an individual's visual suitability for designated occupations or tasks is provided

15. RECORDING OF CLINICAL DATA
    a. Ensures that data is organised in a legible, secure, accessible, permanent and unambiguous manner
    b. All relevant information pertaining to the patient is recorded in a format which is understandable and useable by the optometrist and his/her colleagues
    c. Patient records are kept in a readily retrievable format and are physically secure
    d. Maintains confidentiality of patient records
    e. Understands the need to ensure that access to records is limited to authorised personnel
    f. Information from patient records and/or obtained from patients is released only with the consent of the patient

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4.3 PhD Guidelines

Minimum Standards andProcedure for Award of Ph.D. Degree:

- Every University established or incorporated by or under a Central Act, a Provincial Act,or a State Act, and every Institution Deemed to be a University under Section 3 of UGC Act, 1956 and every degree-granting autonomous College and every affiliated college, allowed to offer Ph.D. programmes.
- Candidates for admission to the Ph.D. programme shall have successfully completed:
    - A 2-year/4-semester Master's degree programme, (after 4 year undergraduate degree) with at least 55% marks in aggregate or its equivalent grade 'B' (or an equivalent grade in a point scale wherever grading system is followed) or an equivalent degree from a foreign educational institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of educationalinstitutions.
    - A candidate seeking admission after a 5-year/10-semester Bachelor's degree withResearch should have a minimum CGPA of 7.0/10.
    - A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.

      Note: The eligibility marks of 55% (or an equivalent grade in a point scale wherever grading system is followed) and the relaxation of 5% to the categories mentioned above are permissible based only on the qualifying marks without including the grace mark procedures,if any.
    - A relaxation of 0.5 score in CGPA or an equivalent relaxation of grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.
    - Ph.D. programme shall be for a minimum duration of two years excluding course work or minimum of 3 years including course work, anda maximum of six years.
    - Extension beyond the above limits will be governed by the relevant clauses as stipulated in the Statute/Ordinance of the individual Institution concerned, but not beyond more than two years or 3 years as mentioned above.

- All Universities shall admit Ph.D. Scholars through a National Eligibility Test (NET) or National Entrance Test or an Entrance test/exit exam conducted by NCAHP.
- Eligibility criteria to be a Research Supervisor, Co- Supervisor, Number of Ph.D. scholars permissible per Supervisor, etc.
- Any regular Professor/Associate Professor of the University/ College, with at least five research publications in peer-reviewed or refereed journals after obtaining PhD and any regular Assistant Professor of the university/ college with a minimum of five years teaching/research experience with a Ph.D. degree and at least **three** research publications in peer-reviewed or refereed journals may be recognized as Research Supervisor.
- Provided that in areas/disciplines where there is no or only a limited number of peer- reviewed or refereed journals, the Institution may relax the above condition for recognition of a person as Research Supervisor with reasons recorded in writing.
- Only a full-time regular teacher of the University/ College concerned can act as a Research Supervisor. Adjunct faculties are not permitted to be Research Supervisors except being Co-supervisor. However, Co-Supervisors from within the same department or other departments of the same institution or sister institutions may be permitted with the approval of the Research Advisory Committee.
- In specific cases of a formal institutional collaboration based on the MoUs, the Universities/Colleges concerned may approve a faculty member as Research Supervisor/Co-Supervisor for a Ph.D. candidate from the collaborating institution.
- In the case of topics which are inter-disciplinary and where the Department concerned feels that the expertise in the Department has to be supplemented from outside, the Department may appoint a Research Supervisor from the Department itself, who shall be known as the Research Supervisor, and a Co-Supervisor from outside the Department/ Faculty/College/University on such terms and conditions as may be specified and agreed upon by the consenting Institutions
- The allocation of Research Supervisor for a selected research scholar shall be decided by the Department concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors, and research interests of the scholars as indicated by them at the time of interview/viva voce.

- A Research Supervisor/Co-Supervisor who is a Professor cannot guide more than eight (8) Ph.D. scholars at any given point of time. An Associate Professor as Research Supervisor can guide up to a maximum of six (6) Ph.D. scholars (including co-supervision) and an Assistant Professor as Research Supervisor can guide up to a maximum of four (4) Ph.D. scholars. One additional research scholar can be allotted to each supervisor over and above the allotted number provided the Research Supervisor is implementing a major sponsored research project. Further, each Research Supervisor/Co-Supervisor can guide two international students on a supernumerary basis. At any point of time the total number of candidates under a research supervisor shall not exceed the number as prescribed above including the candidates under co-supervision.

  Note: The Research Supervisor should declare the number of Ph.D. scholars registered with him/her periodically to the University/College. He/she cannot increase the number by usingrecognition from multiple universities/colleges.

- University teachers after superannuation, if they are re-appointed in the parent University ascontract or honorary or distinguished or emeritus professor, may continue as Research Supervisors till the age of 70. The university/college, after considering the research track record and fitness of such superannuated teachers to supervise scholars, may decide on his/her continuation as Research Supervisor with or without financial commitment.

- Minimum number of the credit requirement for the Ph.D. programme should be at least 12 credits and a maximum of 16 credits.

- The coursework shall be treated as a prerequisite for Ph.D. preparation. A minimum of four credits shall be assigned to one or more courses on Research Methodology which could cover areas such as quantitative methods, qualitative methods, computer applications, research ethics, and review of published research in the relevant field, fieldwork, etc.

- Students who register for Ph.D. directly from four-year undergraduate with research will have to undertake 6-8 credit courses (at Ph.D. level) about relevant skills/research techniques/domain-specific subjects offered by the University.

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- All Ph.D., entrants irrespective of discipline, shall be required to take credit-based courses in teaching/education/pedagogy/writing related to their chosen Ph.D. subject during their doctoral training period. Other courses shall be advanced-level courses preparing the students for the Ph.D. degree. Lifelong learners/ accomplished researchers as evinced from their original contributions in terms of patents granted or new relevant knowledge or/and artistic practices desirous to get a research degree the Research Advisory Committee may provide choices in selecting the courses/ credits that facilitates the entrepreneur in the monetization of IP thus generated. Credits earned for completed course work are transferable from one institution to another institution through the Academic Bank of Credits. All fresh Ph.D. entrants, irrespective of discipline, will be required to take credit-based courses in teaching/education/pedagogy/writing related to their chosen Ph.D subject during their doctoral training period. Ph.D. scholars may also have 3-4 hours per week of actual teaching experience gathered through teaching assistantships or other forms of knowledge dissemination that are not repetitive. All dissemination activities including External presentations and posters, popular articles conveying scientific information (or scientific articles) to the general public, production of books, commissioned research and Internal presentations must be approved by the departmental level Research Committee. Teaching for the Department, supervision of fellow students/technical staff, dissemination tasks can also be credited as knowledge dissemination and as a work commitment.
- The Department where the scholar pursues his/her research shall prescribe the course(s) to him/her based on the recommendations of the Research Advisory Committee (RAC) of the research scholar.
- All candidates admitted to the Ph.D. programmes shall be required to complete the course work prescribed by the Department during the initial one or two semesters.
- Grades in the course work, including research methodology courses shall be finalized after a combined assessment by the Research Advisory Committee and the Department and the final grades shall be communicated to the Institution/College.
- A Ph.D. scholar has to obtain a minimum of 55% of marks or its equivalent grade in the UGC10-point scale (or an equivalent grade/CGPA in a point scale wherever grading system is followed) in the course work in order to be eligible to continue in the programme and submitthe thesis.
- There shall be a Research Advisory Committee, or an equivalent body for a similar purpose as defined in the Statutes/Ordinances of the Institution concerned, for each Ph.D. scholar. The Research Supervisor of the scholar shall be the Convener of this Committee. This Committee shall have the following responsibilities:

- To review the research proposal and finalize the topic of research;
- To guide the research scholar to develop the study design and methodology ofresearch and identify the course(s) that he/she may have to do.
- To periodically review and assist in the progress of the research work of theresearch scholar.
- A research scholar shall appear before the Research Advisory Committee once in six months to make a presentation of the progress of his/her work for evaluation and further guidance. The six-monthly progress reports shall be submitted by the Research Advisory Committee to the Institution with a copy to the research scholar.
- In case the progress of the research scholar is unsatisfactory, the Research Advisory Committee shall record the reasons for the same and suggest corrective measures. If the research scholar fails (even after 3 failures or 3 attempts) to implement these corrective measures, the Research Advisory Committee may recommend the cancellation of registration from the programme.
- Upon satisfactory completion of course work and obtaining the marks/grade, the Ph.D. scholar shall be required to undertake research work and produce a draft dissertation/thesis within a reasonable time, as stipulated by the Institution concerned based on these Regulations.
- Before the submission of the thesis, the scholar shall make a presentation in the Department before the Research Advisory Committee of the Institution concerned which shall also be open to all faculty members and other research scholars. The feedback and comments obtained from them may be suitably incorporated into the draft thesis in consultation with the Research Advisory Committee.
- It is desirable that the research work of Ph.D. scholars is published in peer reviewed or refereed journals and presented in conferences/seminars. At least 2 publications in peer reviewed Scopus/ Science Index journals are mandatory (It can be 1 publication and 1 conference presentation also).
- The quality assessment of Ph.D. degrees should be the responsibility of the Institutions. The institutions are free to evolve guidelines in this regard, if needed.
- The thesis shall be submitted together with an originality report produced by an anti- plagiarism software application. The supervisor (and co-supervisor, if there is any) shall receive an originality report on the whole text of the thesis and shall take this report into account in the evaluation on the submission.

Note: An originality report is not to be considered as sufficient proof that the submitted thesis does not contain plagiarized text. Avoiding plagiarism and other forms of academic misconduct in the authorship of the thesis remains the sole responsibility of the researcher. If the Research Supervisor (or Co-Supervisor) suspects plagiarism, he or she may ask for an investigation.

The Ph.D. thesis submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least two external examiners, who are experts in the field and not in employment of the Institution. Examiner(s) should be academics with a good record of scholarly publications in the field. Out of the two external examiners, one must be from out of the state in which the institution is located. Where possible, one of the external examiners may preferably be chosen as a distinguished academician, not below the rank of Professor or equivalent, from outside India. The viva-voce examination based, among other things, on the critiques given in the evaluation report, shall be conducted by the Research Supervisor and at least one of the two external examiners and shall be open to be attended by Members of the Research Advisory Committee, all faculty members of the Department, other research scholars and other interested experts/researchers.

- If the research results of the thesis constitute new possible things for the protection of intellectual property rights (IPRs), the Ph.D. candidate and Supervisor shall inform the University or the Research Advisory Committee about the matter. In this case, the Ph.D. candidate, with the consent of the Supervisor, may request that the submitted dissertation be treated discreetly before the thesis is submitted for assessment, until the defence/viva-voce. The IPR Cell or the competent body of the university designated for the purpose shall conduct the procedure for legal and commercial protection of research results, in accordance with the relevant Regulations. In this case, the public defence can be extended, in agreement with the Ph.D. candidate, at the latest for a year, starting on the day of the procedure of evaluation of the dissertation. Request for extension of defence/viva-voce must accompany the Certificate of the Technology Transfer from the competent authority.
- The viva-voce of the research scholar to defend the thesis shall be conducted only if the evaluation report(s) of the examiner(s) on the thesis recommends acceptance. If one of the evaluation reports of the examiner in case of a Ph.D. thesis, recommends rejection, the Institution shall send the thesis to an alternate examiner out of the approved panel of examiners and the viva-voce examination shall be held only if the report of the alternate examiner is satisfactory. If the report of the alternate examiner is also unsatisfactory, the thesis shall be rejected, and the research scholar shall be declared ineligible for the award of the degree.

- The Institutions shall develop appropriate methods so as to complete the entire process of evaluation of Ph.D. thesis within a period of three months from the date of submission of the thesis.
- Academic, research, administrative, and infrastructure requirements to be fulfilled by Post Graduate Colleges for getting recognition for offering Ph.D. programmes:
- Post Graduate Departments of Universities/Colleges may be considered eligible to offer Ph.D. programmes only if they satisfy the availability of eligible Research Supervisors, required infrastructure, and supporting administrative and research promotion facilities as per these Regulations.
- Post Graduate Departments of such Colleges, Research laboratories of Government of India/State Government with at least two Ph.D. qualified teachers/scientists/other academic staff in the Department concerned along with required infrastructure, supporting administrative and research promotion facilities as per these Regulations, stipulated below, shall be considered eligible to offer Ph.D. programmes. Post GraduateColleges should additionally have the necessary recognition by the Institution under which they operate to offer Ph.D. programme.

Colleges with adequate facilities for research as mentioned below alone shall offer Ph.D. programmes:

- Exclusive research laboratories with sophisticated equipment as specified by the Institution concerned with provision for adequate space per research scholar along with computer facilities and essential software, and uninterrupted power and water supply;
- Earmarked library resources including latest books, Indian and International journals, e-journals, extended working hours for all disciplines, adequate space for research scholars in the Department/ library for reading, writing and storing the studyand research materials;
- Colleges may also access the required facilities of the neighboring Institutions/Colleges, or of those Institutions/Colleges/R&D laboratories/Organizations which have the required facilities.
- All requirements for the Ph.D. degree of such candidates must be duly fulfilled. It is the joint responsibility of the affiliated Colleges, University departments/ Universities**.**
- Notwithstanding anything contained in these Regulations or any other Rule or Regulation, for the time being in force, no University/College shall conduct Ph.D. programmes throughdistance education mode/online mode.

- Candidates in service shall be allowed to do Ph.D., provided all the eligibility conditions mentioned in the extant Ph.D. Regulations are met.
- Following the successful completion of the evaluation process and before the announcement of the award of the Ph.D. degree(s), the Institution concerned shall submit an electronic copy of the Ph.D. thesis to the INFLIBNET/Institutional Electronic Archive, for hosting the same so as to make it accessible to all Institutions.
- Shodhganga theses repository/registration is also mandatory.

The guidelines pertaining to matters such as full-time and part-time enrolment, roles and responsibilities within departmental research committees, admissions procedures, supervision arrangements including co-supervisors, regulations concerning leave and vacation entitlements, funding protocols, fee structures, registration processes, duration of study, coursework requirements, qualifying examination procedures, criteria for publication, guidelines for the submission of final theses, and appointment of external examiners, etc., are subject to alignment or modification in accordance with the regulations stipulated by the National Commission for Academic and Health Professions (NCAHP) as amended periodically.

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Chapter 5

Competency Standards for Entry Level into the Profession of Optometry in India

Chapter 5: Indian Entry Level Optometry Competency Skill Standard (IELOCS)

These standards have been developed for the profession, as it exists in 2011 and are expected to be altered as technology and knowledge expand, optometrists' clinical skills and community expectations broaden and professional aspirations are fulfilled

What is a competency?

'Competency is the **Ability** to perform the activities within an occupation or function to the standard expected in employment'.

OR

Competency has been defined as the **Ability** to perform the responsibilities required of professionals to the standards necessary for safe and effective practice.

A competency will be a combination of the specification and application of a knowledge or skill within the occupation, to the appropriate standard. It will include the requirement to perform individual tasks; to manage a number of different tasks, to respond to irregularities and breakdowns in routine and to deal with the responsibilities and expectations of the work environment. Thus, it will be a combination of task skills, task management skills, contingency management skills and job/role environment skills.

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Competency-based standards are seen to encompass all forms of achievement of competence rather than only formal indicators such as formal qualifications from educational institutions and could have a role in the process of articulation or linkage between professions and related trades or occupations.

What is the goal of developing Entry Level Optometry Competency Skill document?

The goal of the IELOCS is to enable the schools of optometry in India to design their curriculum based on this document so that the optometry students passing out from their institute achieve the expected competency skills in/for the profession of optometry.

Terminology:

Some terms used in this document have specific meanings within the context of competency standards.

Unit: A major segment of the overall competency of the profession, typically representing a major function or role of the profession.

Performance criteria: Evaluative statements which specify the required level of performance.

Indicators: Measurable and observable features, which can assist in determining whether a competency is achieved.

Classification Units of Competency Skills at Entry level for Optometrists

A) Communication Skills

B) Professional Conduct

C) Patient Examination and Management

D) Optical Dispensing

E) Documentation

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Communication Skills	**Ability** to communicate effectively with the patient, taking into accounts his/her physical, emotional, intellectual, social and cultural background. **Ability** to build rapport and empathy with patients from all backgrounds **Ability** to take a structured, efficient, accurate history from patients with or without any ophthalmic and / or systemic problems and needs. **Ability** to impart information in a manner which is appropriate to the recipient **Ability** to be flexible in routine so as to make assimilation of information easyespecially with illiterates, people with special needs
Professional Conduct	**Ability** to protect patient data and records for confidentiality. **Ability** to manage patients in a safe, appropriate and confidential environment. **Ability** to comply with legal, professional, and ethical issues relating to practice.
Patient Examination and management	**Ability** to measure vision and visual acuity **Ability** to detect and measure the spherical, astigmatic and presbyopic corrections **Ability** to prescribe refractive correction for different age groups and visualneeds. **Ability** to examine and identify abnormalities of the external eye andadnexa using appropriate instruments and techniques **Ability** to differentiate and grade normal and abnormal findings **Ability** to examine and identify abnormalities of the cornea using appropriate instruments and techniques **Ability** to use contact and non-contact tonometers to measure intraocular pressureand analyse and interpret the results **Ability** to examine and identify abnormalities in the anterior chamber **Ability** to examine and identify abnormalities in the iris and assess pupil reflexes **Ability** to examine and identify abnormalities in the crystalline lens using appropriate instruments and techniques **Ability** to examine and identify abnormalities in the vitreous and fundi using appropriate instruments and techniques **Ability** to diagnose and manage the case within the purview of the optometry care.

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	Ability to select appropriate, and use safely, the range of ophthalmic drugs and diagnostic stains available to an optometrist **Ability** to formulate the follow up routines **Ability** to refer where appropriate for further management **Ability** to interpret all investigation reports.
Contact Lenses	**Ability** to take relevant history including previous contact lens wear **Ability** to prescribe Contact lenses appropriate for different age groups and visual needs **Ability** to assess anterior eye health as a part of pre-fitting evaluation **Ability** to quantify corneal shape and size, and pupil **Ability** to select the optimum lens **Ability** to assess and optimize lens fit **Ability** to teach a patient to safely insert, remove and care for contact lenses **Ability** to monitor the anterior eye health of contact lens wearers and refer where appropriate
Binocular Vision	**Ability** to assess eye alignment and eye movements **Ability** to assess sensory fusion and stereopsis. **Ability** to assess oculomotor function. **Ability** to assess convergence and accommodation **Ability** to prescribe orthoptic exercises appropriate for different age groups and visual needs. **Ability** to refer where appropriate for further management **Ability** to formulate the follow up routines
Visual Impairment (Low Vision)	**Ability** to take an appropriate history of a visually impaired patient **Ability** to accurately quantify visual impairment and relate it to the underlying pathology and functional consequences **Ability** to advise on the use of optical and non-optical aids **Ability** to prescribe Low Vision devices appropriate for different age groups and visual needs. **Ability** to refer where appropriate for further management **Ability** to formulate the follow up routines.

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Optical Dispensing	**Ability** to interpret spectacle prescriptions **Ability** to take frame and facial measurements **Ability** to recommend the appropriate lens and frame material and design based onwearers needs and prescription **Ability** to verify, modify and adjust spectacles **Ability** to advice patients on appropriate use of Optical devices
Documentation	**Ability** to record relevant information, results for various examination procedures. **Ability** to record treatment, management and follow up plans **Ability** to obtain patient consent wherever required

Communication Skills

Description: Ability of the optometrists to seek and communicate information from and to the patients. It also means the ability of the optometrist to share the relevant information to the eye care professionals in different contexts.

Required tools: Clinical set up with clean and quiet room, supporting materials such as awareness pamphlets/ leaflets, diagrams, visual simulations, models of the eye / clinical conditions

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behavior**
Ability to make the patient comfortable and gather information from the patient	• Has basic knowledge on important details pertaining to the purpose of visit and history taken to be ascertained from the patient / attender	• Greets the patient in a culturally and socially appropriate way • Ability to build and sustainrapport and trust • Demonstrates ability to listen actively to the patient, understand and summarize the information to get confirmation from the patient	• Smiles and greetsthe patient and their attendant • Listens to patientand responds politely • Uses friendly toneof voice
Ability to identify and respond appropriately to patients' fears, anxieties and concerns about their visual welfare	• Understanding of verbal and non-verbal communication • Understanding of how to recognize emotions in patients and their expressions.	• Establishes and maintains a good professional and clinicalconduct with the patient to inspire trust and confidence • Explores patient concerns and provides reassurance where appropriate, using explanations that are relevant to that patient	• Empathy • Patience
Ability to understand the patient's spoken and unspoken expectations and aspirations for vision care. Manage situations when there is a challenge to fulfil.	• Have understanding on the roles of optometrists and the extent to which they can deliver information to patient • Know about the protocol and ethical practice in medical care	• Explores and understands patients' expectations • Appropriately guide and referthe patient to other professionals as per the need of the patient	• Same as above

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Ability to communicate with patients who have language difficulties, or who are confused, reluctant / give inaccurate information	• Knows alternative ways to examine and explain medical condition to patients and attenders • Knows necessary languages	• Conveys clinical conditions inan informative and understandable way using simpler terms • Makes effective use of bodylanguage to support explanation • Uses appropriate supporting material like patient awareness documents, models etc. for explaining the clinical condition • Takes help from interpreters wherever needed	• Same as above
Ability to discuss with the patient the importance of systemic disease and its ocular impact, its treatment and the possible ocular side effects of medication.	• Have thorough understanding of the disease process in cases such as diabetes, hypertension and other common systemic diseases having common ocular manifestations	• Provides simple explanationto the ocular manifestationsof the systemic disease in question	• Same as above andcreativity
Ability to explain to the patient the implications of their pathological or physiological eye condition	• Have understanding on the ocular conditions and physiology	• Gives factually relevant information in a clear and understandable way, avoidingjargon and technical terms • Uses appropriate supporting material, for example, diagrams or leaflets.	• Same as above andcreativity

Ability to communicate effectively with any other person involved in the care of the patient	• Based on the diagnosis have understanding on thepsychological state that can be expected from the patient	• Establish good rapport with thepatient/attender and explains the details about the diagnosis,prognosis and management plan	• Same as above
Ability to explain to the patient the Examination and management plan	• Has an understating of the disease and steps for diagnosis based on history • Knows the appropriate management plans for the clinical condition	• Summarizes the history and informs about the expected examination protocol within therole of the optometrist • Explains the management plan Clearly	• Same as above

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Professional Conduct

Description: The optometrist's ability to understand optometry profession's job responsibilities, its limitations, code of conduct and to comply with the legal, ethical and professional aspects of the practice. Optometrist should also be aware of rights of the patients who are seeking the optometric service for dignity, privacy and confidentiality.

This professional conduct should demonstrate to the patients and peers, your commitment to the veryhighest clinical, ethical and professional standards. We believe this code will increase public trust and confidence in the profession, therefore, will improve in understanding the role of the optometrist in primary eye care.

Required tools: Computer, relevant software, stationery, codes and guidelines of professional organizationand regulatory bodies.

Performance Criteria	**Indicators**		
	Knowledge	**Skill**	**Behavior**
Ability to considervision and general health as first priority	• Should have in depth knowledge about various eye and general health conditions while examination • Should have essential knowledge about providing an eye care to each individual who visits to your clinic • Should be aware of different types of disabilities and information on patients with additional needs • Should have essential knowledge about rights and dignity of the patients	• Recognizes and considers patient's specific needs and requirements in vision care • Demonstrates best of theresources to improve the visual requirements • Explains the course of present and planned treatment	• Greets and respects all patients and their attendants in a caring, sensitive and appropriate manner • Positive attitude and patience towards patient's requirements • Ensures equal care and treatment is provided to all patients

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• Ability to manage confidentiality of patient's demographic and medical record data	• Should have adequate knowledge of data protection and how this will impact security, access and confidentiality of the patient's records • Should have essential knowledge to ensure the patient environment will remain safe and user-friendly, in terms of access and facilities	• Conversant in using various digital devices, access cloud storage platforms and saves electronic medical records on system-based software programs and keeps them safe • Demonstrates how to store and retrieve manual medicalrecords	• Seeks consent of the patient before providing information to external stake holders • Restricts self from discussing patient information and condition in any open forum/ external communication
• Ability to adhereto health and safety policies of the practice	• Should have vital knowledge about appropriate personal hygiene, cleanliness of the practice, hygiene relating to instrumentation, contact lenses, disposal of clinical waste etc. • Should be aware of policies of the local governing body and professional organizations	• Implements appropriate measures for infection control • Maintains comfortable, hygienic and risk-free environment	• Proactive approach to health and safetyissues
• Ability to promote ethical and cordial relationship with other health care professionals	• Should have essential knowledge of how to maintain practice in accordance with other professional health carestandards	• Explains the condition that are treatable/correctable beyond your practice standards • Refers to respective specialties with careful diagnosis and referral letter	• Honesty and understanding of own limitations

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• Ability to comply with legal, professional and ethical guidelines, law and codes	• Should have in depth knowledge of ethical practice and standard operating procedures followed in the clinical examination and referrals • Should have vital knowledge of the law, codes and guidelines set by the regulatory body of profession and fully aware of the consequences if not followed.	• Explains the uses of various diagnostic tests and their importance in the process of examination • Follows the code of conduct set down by the council/ appropriate authorities	

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Patient Examination and Management

Description: Ability of the optometrist to obtain accurate history, to perform (according to internationally accepted standard procedures) clinical refraction, anterior and posterior segment evaluation, status of cranial nerves related to eye and adnexa, ability to evaluate for, select and prescribe contact lens and low vision devices, evaluate binocular vision status,arrive at the diagnosis,manage/ co- manage, counsel, prescribe and/or refer them to appropriate health care professionals/rehabilitation professionals.

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Required instruments and tools:

Must have

- Distance acuity charts
- Near vision charts
- Contrast sensitivity chart
- Trial frame
- Trial lenses
- Jackson cross cylinder
- Stereopsis chart
- Colour vision chart
- Torch light
- Lensmeter (focimeter)
- Retinoscope
- Keratometer
- Slit lamp biomicroscope
- Non-contact tonometer
- Direct Ophthalmoscope
- Perimeter
- Schirmer's strips
- Fluorescein strips

Desirables

- Autorefractor
- Corneal topographer
- Applanation tonometer
- Non-mydriatic fundus camera
- Anterior and posterior segment imaging equipment
- Glare tester
- Perimeter
- Rose Bengal stain
- Sterile water vials
- Syringe
- 26-gauge needle

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Performance Criteria	Indicators		
	Knowledge	Skill	Behavior
Ability to obtain relevant history and information relating to general health, previous ocular health, previous surgical/laser interventions, information on the investigation done, medication, family history, work, lifestyle and personal requirements	• In depth knowledge on different ocular and systemic conditions. • A deep understanding of what aspects of history are relevant and what questions to ask and how to ask. • Awareness of evidence based optometric practice literatures or guidelines to avoid errors related to clinical practice.	• Elicits the chief complaints, laterality, associated symptoms, past ocular history, family history, past medical history, medical (past and present) and surgical interventions (past), investigations (past and recent) and medicinal allergies. • Ascertains social history, travel history, ethnicity or developmental history wherever necessary • Documents the history in a logical, structured and comprehensive manner and mentally arrive at tentative diagnosis as wellas possible other diagnosis (differential diagnosis) • Probes by asking relevant questions to the patient	• Greets the patient, establishes eye contact,and rapport, allows the patient to speak initially and remain an active listener.
Ability to assess the well-being of the patient before proceeding with the various tests	• Extensive knowledge in the fundamental anatomy and physiology of the human body	• Observes the patients' faces and expressions • Observes the patients' gait, posture and decubitus* • Observes clothing and paraphernalia • Observes stature and habitus	• Being observant, investigative , awareness of the clues

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		• Observes patient's demeanor • Listens to the patients' quality of voice and cough sounds • Observes if patient is cachectic or obese	
Ability to determine the visual acuity / vision of the patient	• Has thorough understanding ofthe concept, various methodsand notations • Is conversant with standard precautions	• Assesses monocular and binocular visual acuity testing using equipment such as Snellen chart/ picture charts / illiterate charts / LogMAR / ETDRScharts etc. • Conducts selective age-appropriate assessments • Measures improvement of vision with pinhole were indicated • Assesses vision through objective method if indicated • Assesses contrast sensitivity • Documents the results appropriately	• Conducts the various assessments with confidence • Is analytical in interpretin g the test outcomes
Ability to determine the refractive statusof the patient objectively	• Has in-depth understanding of theoptics of the eye • Has in-depth knowledge on the various methods and the process of assessingthe refractive status of the eye	• Determines the refractive status of the patient eye objectively using retinoscope • Cross checks retinoscopywith keratometry and autorefractor values if required • Carries out cycloplegic refraction judiciously within legal boundaries	• Is proficient, confident and culturally sensitiveto the use of various instruments like retinoscope, keratometer, autorefractors, pertained to

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	• Understands the role ofaccommodation in determining the refractive state of the eye • Understands the need for cycloplegia and knowledge of various cycloplegic agents		the assessment of refractive status objectively • Is analytical in interpreting the test outcomes
Ability to determine the refractive statusof the patient subjectively and prescribe appropriate glasses.	• Understands the visual characteristics of various refractive statesof the eye namely emmetropia and ametropia • Has general understanding of the relationship between disease states and refractive state of the eye • Understands the needfor clear vision • Understands the influence of age, accommodation ocularstructures like cornea and lens on the refractive state of the eye • Understands the prescribing guidelinesfor various refractive errors	• Determines and confirms monocular spherical and cylindrical spectacle prescription • Perform binocular balancing wherever necessary • Determines the near correction of the patient based on relevant factors • Records the values appropriately and prescribes the spectaclefor the patient	• Can appraise andanalyse patient's situations • Is empathetic andsupports patientsin the use of spectacles

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Ability to determine the pupillary functions and ability to refer inindicated cases	• Essential knowledge onpupil dimensions and color, pupillary pathway, and the ocular conditions associated with pupil. • Adequate knowledge of evidence-based practice guidelines on pupillary examination, interpretation, documentation and referral/management • Knowledge on the role of ophthalmologist and optometrist in relation to pupillary abnormalities	• Informs the patient while evaluating the pupils in two different lighting (lesslighting and normal ambient lighting) • Appreciates the pupil size, anisocoria, shape and reaction to light and near objects and differentiate normal from abnormal pupil. • Appreciates direct and consensual light reflex and relative afferent pupillary defect and light -near dissociation of pupil • Documents the findings following a standard protocol	• Before using the torch light, ensure that patient is comfortable with the intensity of the light.
Ability to assess tear dynamics and ability to manage tear abnormalities or refer in indicated cases	• In-depth knowledge about tear film layers, its structure, functions, properties, compositionand associated abnormalities • Keep abreast of the new evidences in the practice of diagnosing and managing tear filmabnormalities • Knowledge of the basicoptical principles of instruments used for evaluating tear film	• Evaluates the tear film layers, associated cornealand conjunctival changes by using appropriate equipment and questionnaire. • Performs relevant tests to assess the tear film • Documents the findings in appropriate way and arrives at the diagnosis. • Manages and /or refers the patients appropriately	• Seeks approval before performing tests • Demonstrates patience while performing various procedures on the patients

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	• Knowledge on the roleof ophthalmologists and optometrists in relation to conditions associated with tear film.		
Ability to examine the Anterior segment of the eye and ability to refer indicated cases appropriately	• In-depth knowledge related to anterior segment structures, their functions, normaldimensions and abnormal conditions associated with anterior segment • Knowledge on the optical principles of various ophthalmic instruments used for evaluating the anteriorsegment • Knowledge on the roleof ophthalmologists and optometrists in relation to anterior segment conditions	• Evaluates the anterior segment using torch light (with or without loupe) and slit lamp bio- microscope. • Differentiates normal and abnormal findings in anterior segment • Arrives at the probable diagnosis • Interprets the report related to various imaging techniques used to evaluate anterior segment.	• Same as above

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Ability to assess the intraocular pressures of the eye and ability torefer indicated cases	• Adequate knowledge about various types oftonometers, their optical principles, advantages and disadvantages • Adequate knowledge about the physiology ofmaintaining intraocularpressure and probable mechanisms of abnormal intraocular pressure • Knowledge on indications and contraindications of usage of different typesof tonometers	• Demonstrate the usage of various kinds of contact and non-contact tonometers • Calibrates the tonometer before use • Explains the purpose and the procedure of the test performed on the patient • Interprets the readings got from tonometers • Plans further tests essential for those who had deviated eye pressure • Documents the readings in a standard format • Performs tonometry in the follow-up case and counselor refer to the glaucoma expert	• Same as above
Ability to examine the posterior segment of the eye and ability to refer indicated cases	• In-depth knowledge onposterior segment anatomy and physiology as well as pathology along with understanding of various posterior ocular diseases • Adequate knowledge on the optical principlesof various ophthalmic instruments used in diagnosis of posterior segment diseases	• Evaluates central and peripheral retina with appropriate instruments • Uses mydriatic agents, when necessary, withinlegal boundaries • Manages i.e., counsels and/or refers appropriately toretina specialist or low vision care expert with adequate, relevant information	• Same as above

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	• Knowledge about usageof mydriatic. • Appropriate knowledgeon the role of ophthalmologists and optometrists in relationto posterior segment conditions		
Ability to perform ancillary tests based on patient's history and preliminary examination	• Adequate knowledge about various eye conditions, the different ancillary tests to confirm the diagnosis, the basic principle of those tests,the advantages and limitations of those tests, interpretation of the results based on the normative values or master reference document. • Knowledge on existingbest clinical guidelinesand evidences, to decide on the ancillarytests	• Performs appropriate ancillary tests based on thepreliminary findings and complaints. Examples: Colour vision tests, contrast sensitivity function tests, stereopsis test, Gonioscopy, photostress test, perimetry, Amsler grid test, commonly used anterior segment and posterior segment imagingtests, potential acuity meter etc. • Interprets the results/ reports and corroboratesother clinical findings anddiagnoses the condition. • Identifies or detects unreliable findings either due to human error or because of the instrumenterror. • Calibrates the diagnostic instruments or seeks the support of bioengineer or instrument manufacturers when required.	• Same as above

**Decubitus* refers to the observed posture of the patient in bed

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Contact Lenses

Description: Ability of the optometrist to elicit relevant history, perform necessary diagnostic tests and ascertain appropriate type of contact lenses. Optometrist should be able to fit and dispense various types of contact lenses, counsel the patients, manage after care and refer / manage / co- manage patients with the specialists when required.

Required instruments and tools:

Must have		Desirables
• Torch light • Keratometer • Slit lamp bio-microscope • Fluorescein strips • Contact lens trial sets (RGP) & disposable trial lenses (soft)	• Area to teach lens insertion and removal • Mirror • CL solutions • Hand towels/tissues • Wash Basin	• Wratten filter • Burton lamp • Infographics and written instructions • Corneal topographer

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behavior**
Ability to ensure patient safety in contact lens practice	• Understanding of various contact lens solutions and their interactions with different type of lenses and materials • Awareness of various ways of disinfecting contact lens trial sets to make them safe for usage • Understanding of various microbes that may cause issues with lens wear and how to eliminate them	• Demonstrates proper contact lens cleaning and disinfecting steps using various cleaners and even lab cleaners • Makes and follows a disinfecting routine of all trial sets conscientiously	Prioritize patient's safety
Ability to assess the suitability of contact lenses as a form of correction for a patient and counsel the patient accordingly	• Awareness of how the lifestyle, vocational needs, vision, refraction, comfort, duration of wear, environment affects contact lens wear • Knowledge and understanding about the ocular physiology and systemic diseases and their interaction with contact lens materials/types	• Elicits proper history that is relevant for contact lens wear based on the understanding of theory • Assesses ocular integrity and physiology (using slit lamp, keratometer, vital staining, tear function tests) and correlate them to the history to conclude the type of lens	• Be a good listener and ask probing questions without intimidating the patient • Should be polite and understanding yet be confident and assertive when conveying the lens choice • Confident and efficient in performing tests

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	• Ability to spot risks contraindicated to contact lens wear and knowledge to reduce these risks by taking appropriate actions • In depth knowledge of all contact lens materials and lens typesincluding specialty contact lenses	design and material to be prescribed • Counsels the patients regarding probable risk factors, if any and what steps need to be taken tomake contact lens wear safe. • Recommends right lensusing professional expertise	
Ability to fit and order the most appropriate parameters of soft contact lens basedon examination of various ocular parameters	• Understanding about the various soft contact lens parameters and how they translate into lens fitting • Understanding of fitting characteristics of optimum, flat and steep fit and how to modify the fit if not optimum	• Based on the profiting evaluation, selects appropriate soft lens parameters – Back vertex power, base curve, Total Diameter, material, design, withinthe available range of parameters • Assesses the fit of lensesusing a variety of techniques and instruments – Coverage, centration, post blink movement, lens lag, lower lid push-up test, vision, comfort etc.	Patience and conscientiousness

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		• Makes appropriate adjustment in lens parameters for best fit and computes the order for laboratory • Writes an appropriate order for a soft lens	
Ability to train the patient in soft lens handling and how to wear and maintain them	Knowledge of the tricks that may be used to apply and remove the lenses confidently, how various contact lens solutions are different and have detailed understanding about the dos and don'ts of contact lenses	• Trains the patient in the techniques of soft lens application, removal and other relevant handling instructions • Guides the patient about the advantages and importance of contact lens maintenance and selects the right soft contact lens care system • Instructs the patient on the principles of soft lens wear and care including use of soft lens care products, Dos and Don'ts, aftercare	Exhibits patience, empathy, confidence

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Ability to manage the aftercare of patients wearing soft lenses	• Understanding of adaptation and aftercare issues and how to manage them • Understanding of the routine of a soft CL aftercare consultation -schedules after-care visits, replacement schedules, care and maintenance regimen, deposits • Awareness of indications for lens removal, and of seekingurgent care.	• Thoroughly examines the eye under microscope to pick un any early and unwanted changes so theycan be rectified before it'sa cause of concern • Trouble shoots in case ofany issues • Reinforces care and maintenance instructionsand assesses the compliance by asking thepatient to demonstrate	Be assertive like aconsultant and not to compromise at this step.
Ability to select, fit and order the most appropriate rigid gas permeable contact lens based on patient's refraction, visual requirements and other findings	• Detailed knowledge of the range of rigid lens materials and designs available • Understanding of all theparameters, range of Base curve, diameter and power availability of various RGP CL companies that are available • Knows how to modify the parameters of various RGP CL in orderto obtain an appropriate fit • Knowledge of how to assess fluorescein pattern and the influence of lids on the RGP fit	• Makes the appropriate choice of rigid lens parameters – Back vertex power, base curve, total diameter, optic zone diameter, design, materialetc • Assesses the fitting of a rigid lens – Dynamic andstatic (understands and interprets fluorescein patterns) • Makes appropriate adjustment in lens parameters for best fit • Writes an appropriate order for a rigid lens	• Be empathetic towards any discomfort patient experiences • Patience

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	• Knowledge about RGP lenses used in specialtyfitting such as Keratoconus, OrthoK, scleral lenses, mini scleral lenses		
Ability to instruct the patient in rigidlens handling, howto wear and care for them	• Understanding of the rigid lens care systems– Disinfectants, intensive cleaners etc. • Knowledge to instruct the patient on how to insert and remove RGP CL. • Awareness of the complications in case of a non-compliant patient	• Instructs the patient in thetechniques of RGP lens insertion, removal and other relevant handling instructions • Instructs a patient on the principles of RGP lens wear and care including the use of RGP lens care products, Dos and Don'ts • Explain importance of hand hygiene and lens case hygiene	• Be patient while instructing and while the patient is learning how to use CL • Do not intimidate the patient while teaching how to handle the CL. • Be firm and professional while delivering instruction for CL care.
Ability to manage the aftercare of patients wearing rigid lenses	• Understanding of rigid lens adaptation and aftercare issues and how to manage them • Knowledge of the content and routine of a rigid CL aftercare consultation	• Carries out the relevant tests and assessments which are required in a routine rigid lens aftercareconsultation • Schedules appropriate time lines for after care • Analyses the care regimenthat the patient is following and correlate with what was prescribed	• Observation skills as you elicit history of patient and complaints if any

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		• Asks probing questions topatient in terms of how he/she handles and takescare of CL • Requests patient to demonstrate cleaning procedure in front of the practitioner	
Ability to manage astigmatic patients with contact lenses	• Knowledge of the types of astigmatism • Understanding of the designs and materials available in toric contact lenses	• Chooses the appropriate type of CL correction to meet the relevant needs of the patient • Assesses the fit and orientation and makes appropriate adjustments in the final prescription– (application of LARS / CAAS rule in toric lenses)	• Explain the need for such a lens and the benefitsof the same to patient.
Ability to manage presbyopic patients with contact lenses	• Understanding of presbyopia • Knowledge of various modes of correction for presbyopia such as single vision, multifocal lenses • Understanding of ocular dominance and troubleshooting in case patient is dissatisfied with the outcome	• Explains to the patient various options that are available in correcting presbyopia with CLs and explains their benefits toenhance the lifestyle of the patient. • Chooses the appropriate type of CL correction to meet the relevant needs of the patient • Assesses fit, vision and modifies the prescription/fit if necessary.	• Active listening, probing and counselling

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Ability to verify the parameters on receiving the lenses	• Understanding of prescription format and lens packaging • Awareness of acceptable norms and standards • Knowledge of principles,construction, step-by- step process and calibration of instruments used to verify parameters	• Checks material, power, base curve, diameter of thedelivered lens against the prescription order • Verifies power, base curve, diameter of the lens against the denoted parameters	• Eye for detail and conscientiousness • Be polite yet firm and specificin dealing with the manufacturers in case of discrepancy
Ability to recommend and prescribe therapeutic and cosmetic/ prosthetic contactlenses	• Demonstrates an understanding of conditions requiring these lenses –Aniridia; trauma; amblyopia; corneal scar, recurrent corneal erosion, bullous keratopathy etc. • Knowledge of materials, parameters and availability of bandage lenses • Knowledge of fitting, aftercare and complications of these lenses	• Makes appropriate choiceof lens parameters –base curve, total diameter, material, tint etc. • Accurately assesses the fit ofthe lens • Recommends appropriateafter care schedule	• Empathetic towards patient during the entire procedure • Shows patience and confidence while smoothly maneuvering through various steps
Ability to identifyand manage Contact lens related complications	• Knowledge of etiology, symptoms, signs and management of contact lens related complications	• Identifies CL complications onthe basis of etiology, type of lens, structures • Evaluates previous wear compliance • Demonstrates skilled history taking related to problem solving	• Be a good listener and ask probing questions • Exhibits patience, empathy, confidence to get the best out of the patient

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		• Manages the complication within the scope of practice and demonstrates understanding of timely referral	• Demonstrates observation and analytical skills to connect the symptoms and signs
Ability to refer special cases tocontact lens experts	• Knowledge of various conditions that can be alleviated by specialty contact lenses	• Identifies conditions that require specialty contact lens fitting - Keratoconus, irregular corneas, dry eye,post refractive surgery, myopia management etc. • Refers the patients to relevant practitioner	• Shows respect while interacting with other professionals • Crisp and clear communication

Binocular Vision

Description: Ability of the optometrist to elicit appropriate history, to understand and perform relevant clinical binocular vision diagnostic tests and ascertain appropriate diagnosis for strabismic and non-strabismic anomalies. He/she should also be able to perform basic vision therapy and refer /manage / co-manage patients with the specialists in the field of binocular vision and vision therapy.

Required instruments and tools:

Must have	Desirables
• Worth's Four Dot Test	• Vergence flippers
• Accommodative flippers (+/- 1.50, 2.50)	• Transilluminator
• Thorington card (distance and near)	• Translucent occlude
• Maddox rod and trial lenses (complete trial set)	• Gulden sticks
• Prism bars (horizontal and vertical)	• Rotary prism
• Stereo acuity test	• MEM cards
• Streak Retinoscope	• WFDT torch
• Direct Ophthalmoscope	• Loose prism set

Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behavior**
• Ability to assess and interpret the diagnostic parameters of motor binocular vision and oculomotor performance	• In depth knowledge of Binocular vision, its functions, and abnormal conditions associated with binocular vision • Anatomical and physiological knowledge of the extra ocular muscles, vestibulo ocular complex, their neurological connections and nerve supply • Essential knowledge related to pathophysiology of various conditions associated with extra ocular muscles. • Knowledge of normaland adverse oculomotor responses related to: Stability and eccentricity of fixation, versions, vergences, near vision complex, ductions, saccades, pursuits, ocular deviations, comitancy, physiological and	• Demonstrates good communication skills and explains the tests and the procedures to the patient/ the care giver in a simple language withoutusing technical jargon. • Performs a detailed assessment of oculomotor functions in infants, children and adults using standard clinical procedures and interprets these findings in the light of the underlying physiology of these responses: steady-state fixation (stability of fixation, eccentricity of fixation, etc.), ductions, saccades, pursuits, various forms of physiological and pathological nystagmus, vestibulo-ocular reflex • Performs a detailed assessment of the binocular oculomotor functions in infants, children and adults using standard clinical procedures sequentially, using appropriate equipment and interpret these findings in the light of the underlying physiology of these	• Able to establisheye contact, andrapport, allows the patient to speak initially and remains an active listener. • Should have a good observation and analytical capacity to notice and interpret small changes in the movements of the eyes and body while performing the test • Should havepatience to carry out the tests and repeat them if required. Should be able to explain and clarify the questions confidently and adequately. • Should be confident, adaptable, andculturally sensitive towards the patients. • Should be empathetic towards the patient and understand their difficulty if they are not able to perform any procedure adequately.

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	pathological nystagmus. • Essential knowledge of the principles and procedures for various oculomotor and vestibulo ocular tests used for evaluating binocular vision anomalies. • Knowledge of standard terminologies and abbreviations used inthe interpretations and analysis of the tests performed. • Awareness of the role of optometrist in relation to oculomotor anomalies	responses: vergence (fusional, accommodative, proximal), horizontal and vertical phorias, graphical analysis of the zone of clear and single binocular vision, versions and comitancy of deviations.	
• Ability to assess and interpret accommodative status.	• Essential knowledge of mechanism of accommodation, accommodation pathway, range and amplitude of accommodation and the ocular conditions associated with accommodation.	• Explains the tests and the procedures to the patient/ the care giver in a simple language without using technical jargon. • Able to measure near point of accommodation and amplitudes (monocular and binocular),relative accommodation, accommodative facility (monocular and binocular),	• Same as above

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	• Knowledge of the tests to assess magnitude, facility, response and relativecooperation of accommodation withvergence. • Adequate knowledgeto interpret results of accommodation examination, management, co management and referral of the patients appropriately.	accommodative response and accuracy using standard test procedures and equipment.	
• Ability to assess and interpret the diagnostic parameters of sensory binocular vision	• Adequate knowledge of neuroanatomy of the visual system, purpose and relevance of sensory processing. • Knowledge of sensory tests, their principles, procedures, and interpretation of the test results. • Knowledge of use of appropriate illumination levels, complimentary colours, their wavelength and the effects on the sensory status.	• Explains the tests and the procedures to the patient/ the care giver in a simple language without using technical jargon. • Performs a detailed assessment of various aspects of the sensory binocular system using standard clinical procedures and equipment. • Interprets the findings in the light of underlying physiology of these responses:normal and abnormal forms of sensory correspondence, fusion,diplopia, suppression, stereopsis, distortions inspace due to abnormal binocularity	• Same as above

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	• Understanding of neural adaptation, its mechanism, and its application clinically.	(e.g., those induced due to aniseikonia, anisometropia, etc.).	
• Ability to diagnose and manage amblyopia	• Understanding of the causes for development of amblyopia. • Adequate knowledge of neuro plasticity and its mechanism. • Knowledge of the latest treatment/management modalities for amblyopia. • Understanding of how to manage, co-manage, and further refer the patient appropriately.	• Explains the tests, procedures, and possible prognosis to the patient/caregiver. • Performs diagnostic tests to evaluate the underlying sensory and spatial adaptations in amblyopia (e.g., decreased visual acuity, contrast sensitivity, crowding, suppression). • Performs tests to evaluate underlying motor discrepancies resulting in amblyopia (e.g., poor accommodative and vergence behaviour, eccentric fixation, etc.) • Manages and co-manages the patient using non-surgical procedures such as different types of occlusions, lenses (spectacles and contact lenses), and basic vision therapy procedures. • Refers the patient appropriately for surgical or medical management.	• Same as above

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• Ability to identifyand manage children at risk of developing binocular vision anomalies.	• Knowledge and understanding of neural and ocular development (pre, peri, and post-natal). • Sufficient knowledge of delay/improper neural/ocular development at different stages. • Knowledge of eliciting appropriate family history and understands developmental disorders leading to binocular vision anomalies. • Knowledge of age-appropriate tests and procedures to diagnose the anomalies.	• Identifies signs and symptoms in relation to personal / family history. • Administers and interprets age-appropriate proceduresrequired to assessdevelopmental ability. • Provides appropriate management to the child within the scope of practice, co-manages when required and refers timely for further management. • Schedules follow up routine appropriate to underlying condition/s.	• Same as above

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Vision Impairment

Description: Ability of the optometrist to obtain accurate history, to perform (according to internationally acceptedstandard procedures) clinical refraction, anterior and posterior segment evaluation, status of cranial nerves related to eye and adnexa, ability to evaluate for, select and prescribe contact lens and low vision devices, evaluate binocular vision status, arrive at the diagnosis, manage/ co- manage, counsel, prescribe and/or refer them to appropriate health care professionals /rehabilitation professionals

Required tools:

Must have	Desirables
• Standardized proforma for history taking • Distance visual acuity charts (logMAR) • Near visual acuity charts (logMAR) • Refraction kit • Color vision / Amsler / Field of vision instruments • Contrast sensitivity charts for adults and children • Low vision devices (Primary / Secondary / Tertiary) • Non-optical devices • Legal concession forms	• Self-illuminated LogMAR chart • Illuminated contrast sensitivity test • Full Aperture trial box and Universal Trial Frame • Electronic Low vision devices • In-House Rehabilitation Facility

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behavior**
• Ability to identify patients benefiting from low vision services	• In depth knowledge on different ocular and systemic conditions • A deep understanding of what aspects of history are relevant and what questions to ask and how to ask	• Takes relevant history from the patient with emphasize on task related history • Elicits the chief complaints, laterality, associated symptoms, past ocular history, family history, past medical history, medical (past and present) and surgical interventions (past), investigations (past and recent) and medicinal allergies. • Documents the history in a logical, structured and comprehensive manner and mentally arrive at tentative diagnosis as well as possible other diagnosis (differential diagnosis) • Probes by asking relevant questions to the patient	• Ascertains social history, travel history, ethnicity • Greets the patient, establishes eye contact, and rapport, allows the patient to speak initially and remain an active listener. • Empathy- understands the psychological status of the patient and counsels if needed before starting the LVD trial • Clear and crisp communication • Remains calm and patient while answering the questions of patients with low vision

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• Ability to perform comprehensive low vision work up	• Knowledge of a comprehensive Low vision work up, including VA, accurate objective and/or subjective refraction, functional vision assessment and suitable rehabilitation	• Assesses functional vision tests, like LogMAR visual acuity for distance and near. Contrast Sensitivity for distance and near • Functional visual field assessment using devices and Amsler test. If patient is SVI category to perform confrontation. • Records other visual functions like color vision and reading speed.	• Same as above
• Ability to identify and prescribe low vision devices suited to the patient's visual requirements and functional • needs	• Knowledge of pathology associated with low vision; and awareness of indications and contraindications of different devices for low vision pathology • Awareness of incidental optical effects, low vision aid design, aberrations, unwanted prismatic effects, tints, lighting requirements associated with different devices.	• Selects and prescribes the most appropriate optical and/or non- optical low vision device • Considers the ability of the patient to manipulate the device and to meet the cost. • Considers the physical ability and the age factor of the patient to manage different devices.	• Same as above
• Ability to demonstrate a range of low visiondevices	• Knowledge of correct working distances with magnification requirements. • Knowledge of appropriate lighting conditions	• Demonstrates selectionof correct working distance to the patient for the power selected. • Evaluates and monitorsthe success of the low vision device and prescribes additional oralternative devices	• Same as above

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	• Knowledge of training requirements for the success of low vision devices for near and distant tasks. • Awareness of patient's compliance with the device. • Knowledge of simulation of the condition and devicesto the escort.	• Schedules appropriate follow up routine and understands its importance	
• Ability to instruct the patient about the use of low vision devices	• Knowledge of optics of LVDs and how the patient needs to be instructed to use device for best performance • Knowledge of eccentric viewing techniques for understanding preferred eye and retinal loci	• Reviews follow up visits, re-assessment of the vision and the efficacy of the device for the functional needs of the patient • Identifies appropriate non-optical device which will be useful along with optical aid for better functional performance • Provides proper instructions on handling the devices and ensures that the patient has understood the process	• Maintains patience throughout the learning and training duration and if needed to get patient to come for multiple visions
• Ability to inform and if necessary, refer the patient to other rehabilitative services.	• Knowledge of correct referral to tertiary Low vision clinics, other practitioners, co-management team (Ophthalmologist, Rehabilitation specialist, Orientation and mobility expert)	• Refers appropriately for further management i.e., Speech therapist, Physiotherapist, Occupational Therapist, Special Educators, Neuro-physicians.	• Maintains motivating tone and provides confidence through appropriate approach

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	• Awareness of career opportunities based on functional vision • Knowledge on visual disability as per Government, handicap certificates and various concessions and job reservations that are provided to visually impaired population.	• Refers to appropriate centers for training for job-oriented competencies	• Infuses hope in patient/ guardian even if devices do not benefit career and other opportunities are present and there is hope.

Optical Dispensing

Description: Ability to counsel, guide and dispense appropriate spectacle lenses (in accordance with international standards), spectacle frames based on the prescription, facial and frame measurements, need and demand of patient upon eye examination done by the optometrist or any other eye care practitioner. It further offers the ability to counsel, guide and dispense appropriate spectacle to pediatric and special populations. It can also be viewed as a common guideline for the optometric institutions to meet the consensus during the dispensing related pedagogic activities. Moreover, the document also provides the list of minimum required equipment necessary to meet the competencies during core institutional education.

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Required instruments and tools:

Must have		Desirables
• Lensometer • Geneva lens measure • Trial box • Axis, PAL's marking & grid chart • Set of Ophthalmic lens types • Set of tinted lens types • Set of lenses with coatings • Trial frame (with vertex reading, PD) • Set of variety of spectacle frames	• Frame measurement ruler • PAL's Dispensing set • PD ruler • Pupilometer • Facial measurement gauge • Head & temple width caliper • Plier set • Frame warmer	• Thickness gauge • UV tester • Polarizing tester • Edger • Spectacle accessories (nose pads, spectacle bands etc.)

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behavior**
• Ability to understand the patient's expectations and visual needs	• In Depth knowledge to classify the visual task, its corrective aid and plan relevant questions accordingly. • Adequate knowledge of lens designs, materials and enhancements and where to recommend them • Differentiate between patient expectations and over expectations.	• Analyze the prescription, visual complaints/demandsof customers and explain itin an appropriate manner. • Compute, relate, predict various vocational and avocational visual needs. Make appropriate choicesof spectacles and discuss them with customers. • Analyze individual's personality, style quotient, visual habits, behavior and needs. • Document the findings.	• Greet the patient, establish eye contact and rapport. • Initiate with appropriate questions • Allows the patient to speak and remain as an active listener.
• Ability to identify errors & interpretthe prescription	• Understanding of the refractive correction, specifications and notations in a prescription.	• Analyses the prescription, identifies the refractive correctionand clarifies any queriespertaining to it • Detects any documentation errors, unusual addition or prism (values & orientation) in the prescription. • Explains and relates the need for correction and their adaptive symptoms • Ensures the standard, validity of the prescription and recognizes any possible errors.	• Crisp and clear communication

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• Ability to identify parameters of previous spectacle and to address the associated concerns	• Understanding of different optical parameters and related instruments. • Knowledge of different forms of transposition. • Adequate knowledge of the lens forms, materials and apparent errors. • Knowledge of various frame materials, types and dimensions essential for fitting.	• Identifies and measures parameters of previous lens design using appropriate tools. • Transposes ophthalmic prescriptions in required forms. • Analyses and correlates patient concerns with previous spectacles based on the assessment of the fitted ophthalmic lens and frame. • In case of customized lenses: correlates the habitual prescription to the actual prescription. • Plans the most suitable spectacle to address patient concerns.	• Actively listens to the patient's feedback with their current spectacles and future expectations. • Patience- Allows sufficient time for the individual to explain the required spectacle-related modifications while setting realistic patient expectations
• Ability to assess suitability of spectacles with respect to patient needs	• Knowledge of refractive errors, visual demands depending on occupational or sports/leisure activities and effect of spectacle correction on visual performance. • Ergonomics: understanding of customer's habits, behavior, visual needs, • personality and lifestyle quotient	• Selects and recommends appropriate spectacle frames & lenses based on needs, personality and lifestyle. • Documents the findings	• Confident communication and thoughtful recommendation with clinical decision making.

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• Ability to assist the patient in making right choice of frame material, type and designs	• In-depth knowledge offrame materials, types, designs and their pros &cons. • Understanding of the suitability of frames basedon the patient's lifestyle & requirements.	• Selects frames based on the patient's physiological factors, features - benefits; suitability, fashion, safety factors, proposed usage and cost. • Correlates magnitude of refractive power and its need to select appropriateframe size and type • Suggests frame designs which suit different age groups/gender, profession and cosmesis.	• Same as above
• Ability to relate facial shape and its proportions in suggesting appropriate spectacle frames.	• Understanding of facial shape and its proportions. • Understanding of relating general anatomical features of face to appropriate frame selection.	• Assesses the proportionsof the face, differentiates its shape/cosmesis and suggests frame shapes accordingly. • Takes precise facial measurements and correlates them with theframe size and fit. • Confirms that the selected frame offers comfort, functionality and suitable fit.	• Confidence and efficiency whiletaking facial measurement
• Ability to recommend appropriate spectacle frames for paediatric age groups	• Knowledge on development of a child's facial features and differencebetween the facial characteristics between a child and an adult.	• Takes accurate facial measurements and appreciates the implications of developinganatomical features • Selects frame that fits appropriately with consideration to prescription and cosmesis.	• Exhibits good communication to ease the child during the entire process. Involves parent/guardian inthe process when required • Empathetic and encouraging behavior

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	• Knowledge of safe frame materials, type and temple styles for a child's active lifestyle. • Comprehensive knowledgeon facial features in special children and awareness of customized frames.	• Orders customized/handmade frames based on facial measurements.	
• Ability to recommend the appropriate ophthalmic lenses, enhancements with protective standards	• Knowledge and understanding of contemporary lenses, enhancements and theiravailability • Knowledge of the types of ocular hazard and conditionsfor recommending appropriate lens treatments/ enhancements. • Understanding of the requirement of accepted norms related to spectacle wear. • Understanding of the conditions requiring special optical appliances.	• Selects, recommends and prescribes special lens designs and enhancements based on prescription and the need. • Chooses and recommends appropriatespecial optical appliancesbased on the condition.	• Empathy and confident communication and thoughtful recommendation with clinical decision making

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• Ability to recommend ophthalmic lenses in paediatric age group	• Understanding of the need for frequent prescription change and choice of ophthalmic lens and enhancements. • Adequate knowledge about special lens/prism fitting techniques in special conditions.	• Effectively integrates lens materials, designs and enhancements to suit the prescription and needs. • Prescribes suitable tints, filters and prisms for children with special needs. • Thoroughly explains the importance to the child/parent about spectacle compliance and follow up visits.	• Effective communication, patience and listening skills while addressing the child and the parents.
• Ability to perform face and frame measurements and markings in adults/pediatrics	• Knowledge of various factors related to facial features development with age, prescription, frame selection and its importance.	• Measures face and frame parameters using appropriate tools. Documents the findings. • Performs frame markings, and correlates to one another. Document the findings.	• Confidence, etiquettes and appropriate communication
• Ability to document and order the parameters of ophthalmic lens and frame to the manufacturer	• Understanding of the need and importance of documenting different parameters for the laboratory and the accepted format of the documentation.	• Records, updates and retrieves the patient information throughout the follow-up visit or during legal issues. • Assesses the availability and orders the recommended parameters. • Highlighting the special instructions within the order form.	• Crisp and clear communication, conscientiousness
• Ability to check whether the finished spectacles follow international standards & tolerance norms	• Knowledge of international standards (ANSI & BS)	• Applies international standard & tolerance level to decide on acceptance or rejection of the spectacle parameters	• Same as above

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	• Recognizes the importanceof implementing stringent verification of spectacles and reducing patient returns.	• Cross-checks the frame parameters and dimensionas per the original order • Plans a course of actionif the spectacle is beingrejected	
• Ability to adjust and align spectacle to standard - before and at the time of delivery	• Understanding of the importance of precise spectacle adjustment and alignment to enhance the visual outcome and comfortand the consequence of inappropriate alignment. • Knowledge of different tools/pliers to be utilizedfor adjusting and aligning spectacles.	• Accurately adjusts and aligns the spectacle as per requirements without causing any damage. • Provides spectacle handling instructions & resources to avoid misalignment or damage.	
• Ability to instructthe patient about adaptation and maintenance of the spectacles	• Knowledge of various adaptive symptoms and their solutions. • Adequate knowledge of care and maintenance of the spectacles and counselling methods.	• Counsels for adaptationand usage of the new spectacle. • Demonstrates best practices for handling thespectacle and its accessories. • Sets realistic expectations with thenew spectacles.	• Respect and respond positively to all the questions and instruct in a structured manner.

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	• Knowledge of frequently asked questions and their appropriate answers related to spectacle, usage, refractive error, ocular health, market trends, eye care products etc.		
• Ability to gather information & manage patients with complaints (Trouble-shooting)	• Comprehensive understanding of complaints of the patientand their root cause. • Knowledge of step-by-stepprocedure to resolve the complaints and underlying cause.	• Probes by asking relevant questions to gather details on the core area of concern. • Re-evaluates frame &lens parameters and correlate any errors to patients' complaints. • Rechecks spectacle fit (on face). Identifies and corrects any misalignments using proper tools. • Decides to re-order of lens for non-rectifiable errors.	• Listens actively, ask relevant questions and uses investigative approach • Empathy
• Ability to manage Inventory	Understanding of the concept of inventory management and stockkeeping	• Observes/oversees purchasing, receiving and sale in the optical business. • Reviews vendor's product availability.	• Conscientiousness

Documentation

Description: Ability of the optometrists to document all the procedures, interactions and dispositions done to the patient in either electronic records (EMR) format or the hard copy; and preserve the document for a specific period as per the legal requirements.

Required Tools: Printed stationery of the work up sheet. Pen, color pencils and a computer with basic software e.g., Excel / EMR software.

Performance Criteria	Indicators		
	Knowledge	Skill	Behavior
• Ability to record all relevant information pertaining to the patient in a format which is understandable and useable by the optometrist and his/her colleagues	• Knowledge of documenting a standard flow of complete comprehensive eye examination, hard copy/ EMR • Knowledge of documenting relevant procedures which are followed in optometry sub-specialty such as CL, BV, LVA, Glaucomaevaluation and retinal diagnostic procedures. • Knowledge of what instrument is used for what purpose and a clear description, drawing or photo is provided for clinical findings. • Knowledge of the internationally accepted abbreviations and ICD codes	• Documents date & time, patient's name and address, examiner's name. • Documents positive and negative history E.g., H/O diabetes, hypertension &IHD • Using standard terminology records the following – external examination / SLE / Refraction in detail / IOT/ ortho-optic work up / ophthalmoscopy etc. • Documents with a clear description, drawing orphoto is for clinical findings. • Records brief clear noteson diagnosis / discussion and consultation. • Gives clear instructions for the next follow up visit. • Provides referral notes to concerned specialist, ocular /medical and urgency of referral with details of tests carried out and provisional diagnosis	• Attention todetail of all procedures conducted • Conscientiousness

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• Ability to keep patient records in a readily retrievable format and physically secure	• Basic computer knowledge (Microsoft excel) to retrieve physical copy of file / electronic medical record (EMR) entry. • Knowledge of correct labelling of physical copies with respect to entries in excel. • Cross referencing • Staff understanding and training of filing system. • Knowledge of EMR back up to cloud or external hard drive.	• Maintains permanent &Legible labelling on physical copy • Retrieves data by name/ date of birth (DOB)/ phone no. (EMR & physical copy).	• Same as above
• Ability to ensure that access to records are limited to authorized personnel and release only with the consent of the patient	• Knowledge of relevant laws relating to confidentiality and duration of preservation of the medical records of the patient. • Knowledge of online security protocols are followed for cloud based EMR systems	• Secures records, from any physical damage. • Maintains records in accordance with ethical standards and the law, patient names and addresses are not released for use in mailing lists. Anonymity of the patient is maintained when confidential information regarding the patient is discussed with others unless those parties are engaged in the management of the patient or prior consent of the patient is obtained.	• Same as above

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		• Maintains EMR back up and storesthem safely in cloud/ hard drive • Ensures every patient signs a consent form to state that they have been informed of and have understood thedata protection policy	
• Ability to write prescriptions in theappropriate format	• Knowledge of the format in which the prescriptions for spectacles, CL Low vision aids and other therapeutics are to be written.	• Writes the prescriptions for spectacles,CL Low vision aids and other therapeutics as per the accepted formats	

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Chapter 5.1: INDIAN MASTERS LEVEL OPTOMETRY COMPETENCY STANDARD (IMLOCS)

Competency Standards for Masters' level into the Profession of Optometry in India

These standards have been developed for the profession and are expected to be altered as technology and knowledge expand, optometrists' clinical skills and community expectations broaden, and professional aspirations are fulfilled.

Classification Units of Competency Skills at Entry level for M.Optom

A. Research and Public Health
B. Advanced Ocular Diagnostics and Management
C. Advanced Contact Lens
D. Low Vision Care and Visual Rehabilitation
E. Vision Therapy
F. Pedagogy

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Research and Public Health	• Ability to do an evidence-based literature review on causes for eye health disorders, and intervention strategies. • Ability to draft research proposals/grant application. • Ability to analyse data using statistical and other methods of data analysis. • Ability to draft research articles (Medical writing) • Ability to critically evaluate the research material. • Ability to conceptualize screening and interventional strategies for a given community. • Ability to plan and execute community eye health programs. • Ability to collect reliable data, analyse and report the same. • Ability to develop hypotheses, project trends, and mathematical models for epidemiological studies. • Ability to innovate and conceptualize cost-effective interventions using technology for eye health services.
Advanced ocular Diagnostics and Management	• Ability to perform clinical decision-making for Ocular abnormalities • Ability to perform and interpret corneal diagnostics including Topography/Pentacam/Orb scan, Specular microscopy, Pachymetry, Abberometry, AS OCT, UBM • Ability to perform pre and post Lasik evaluation • Ability to interpret glaucoma diagnostic reports a. OCT b. HRT c. Gonioscopy d. ONH evaluation • Ability to perform pre and post cataract work up and ocular biometry evaluation and post op follow up management • Ability to perform anterior segment photography and ophthalmic imaging • Ability to manage and co-manage therapeutics for anterior segment

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	• Ability to perform electro diagnostic procedures and interpret electro diagnostic reports a. ERG b. EOG c. VEP • Ability to perform stereoscopic fundus photography • Ability to perform and interpret visual fields • Ability to use Ocular photography as tool for evidence based clinical decision making and progression analysis • Ability to perform posterior segment photography • Ability to manage and co-manage diseases and disorders of posterior segment • Ability to perform diagnostics and develop management protocol for Ocular surface disorders (Meibography, Lipid layer interferometry, Staining, techniques Lid wiper epitheliopathy and Eye closure assessment) • Ability to perform diagnostics, develop protocols for control and management of myopia progression a. Axial length measure b. Accommodation c. Peripheral refraction
Advanced Contact Lens	• Ability to understand corneal anatomy and physiology and its oxygen need • Ability to diagnose and manage complications due to contact lenses • Ability to fit specialized contact lenses. a. Keratoconus b. Rose K lenses c. Mini scleral lenses d. Hybrid lenses e. Orthokeratology f. Scleral lenses g. Myopia h. Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia • Ability to fit paediatric contact lenses

Low Vision Care and Visual Rehabilitation	• Ability to diagnose and manage patients with vision impairment • Ability to perform specialised diagnostics a. Rudimentary vision b. Berkeley visual field test c. Hand disc Perimetry • Ability to train for eccentric viewing and steady eye techniques • Ability to diagnose and manage patients with vision impairment • Ability to perform specialised diagnostics for patients with low vision with multiple disabilities • Ability to train for eccentric viewing and steady eye techniques • Ability to rehabilitate patients with VI with vocational counselling and activities of daily living • Ability to provide Orientation and Mobility training
Vision Therapy	• Ability to diagnose, manage and co-manage binocular vision, strabismic and non-strabismic binocular anomalies • Ability to manage and co-manage visual perceptual disorders • Ability to manage amblyopia • Ability to diagnose and manage neuro-vision and neuro-developmental disorders.
Pedagogy	• Ability to frame learning objectives of a course in alignment with program objectives • Ability to design learning and assessment modules for the given course • Ability to impart the instructional module to achieve intended learning objectives • Ability to choose the form and conduct assessment for the given course • Ability to reflect on the academic processes by analysing learner's feedback and program outcomes

RESEARCH AND PUBLIC HEALTH

Description: The course will aim to develop competencies to become effective researcher. This course will provide an opportunity for students to advance their understanding of research, ethical principles, research process and dissemination of results. Students will gain competence in planning, conducting, evaluating, and presenting a research project.

Required tools: Infrastructure needed to conduct research, Institutional ethics committee, library equipped with scientific journals in optometry and vision sciences, computers with required software (e.g., for statistical analysis, plagiarism tools), Number of clinical instruments as per requirement of individual research study.

Performance criteria	**Indicators**		
	Knowledge	**Skill**	**Behaviour**
Ability to draft research proposals/grant application and conduct research.	• Understanding of basic concepts of research, ethics and integrity, study types, and its process • Knowledge of different research study designs • Knowledge of sources of data for identification of problem • Knowledge of various journal databases and indexing. • Knowledge of finding and appraising relevant literature	• Identifies a problem and formulates a research question/ problem statement. • Ability to perform literature review. • Writes aim, objectives, and hypothesis • Designs study methodology and research instruments • Ability to do Pilot study to check feasibility of research methods • Obtains ethical clearance for the research study • Demonstrates Data collection, data entry and data storage	• Curiosity • Logical thinking • Analytical skills • Organizational & communication skills • Time management

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	• Formulation of research question and hypothesis • Knowledge of Methods and tools of data collection, methods of documentation of research process • Knowledge of ethical aspects in research • Knowledge of various grant agencies in healthcare research		
Ability to analyse data using statistical and other methods of data analysis.	• Knowledge of descriptive and inferential statistical methods • Knowledge of sources of errors • Knowledge of methods of analysis of qualitative data • Knowledge of various software used in data analysis • Knowledge of result reporting formats	• Tests hypothesis by using various statistical / qualitative analysis methods • Demonstrates ability of using appropriate software for data analysis and presentation of results	• Analytical skills • Presentation skills

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Ability to communicate research findings (Academic writing)	• Knowledge of various channels for dissemination of results • Knowledge of essential components of communication of scientific study • Structure of academic writing for scientific journals • Understanding of IPR and plagiarism	• Writes a manuscript • Presentation of research in conference/ scientific forum/ peer groups	• Communication and presentation skills
Ability to critically evaluate the research material	• Knowledge of principles and process of evidence-based practice • Knowledge of critical appraisal tools • Knowledge of methods of literature review • Knowledge of methods of meta-analysis of studies	• Ability to do literature review for the chosen topic	• Analytical skills • Logical reasoning • Critical thinking

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Ability to differentiate cost-effective interventions and utilizing technology for eye health services	• Knowledge of current trends of technological innovations in eye care • Artificial intelligence and other technological developments in eye care • Understanding of steps of the innovation process.	• Demonstrates ability to find problems and provide solutions at least at ideation stage	• Curiosity • Innovation • Design thinking
Ability to implement delivery models for Community eye health programs	• Understanding of various models of service delivery for all leading causes of vision impairment.	• Ability to do a situation analysis of population type and need to develop protocol • Ability to read and access recent expert committee guidelines issues by global opinion leaders and authorities for the given situation.	• Ability to confidently implement the training and smooth functioning go the developed protocol.
Ability to implement Epidemiological Surveys for eye health as well as related systemic conditions	• Understanding of rapid assessment of avoidable blindness studies.	• Ability to do a situation analysis of population type and need to develop suitable survey method / protocol.	• Ability to train a team for data collection, coalition and finally analysis and reporting

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	• Understanding of regional and national epidemiological studies and data in existing domain • Understanding of sampling frame and sample size calculation for epidemiological studies.		

ADVANCED OCULAR DIAGNOSTICS AND MANAGEMENT

Description: Ability of the optometrist to elicit appropriate clinical history, assess the anterior and posterior segment for their structure, health, and functional ability, perform tests and procedures appropriate to the patient's condition and abilities, critically appraise, evaluate, make clinical decisions, manage/co-manage, counsel, prescribe and/or refer them to appropriate health care professionals/rehabilitation professionals.

Required instruments and tools:

Must Haves		Desirables
• Refraction unit • Keratometer • Slit lamp bio-microscope. • Applanation tonometer • Non-contact tonometer • Non-mydriatic fundus camera • Brightness acuity tester • Colour vision • Amsler chart	• Perimeter • Schirmer's strips • Fluorescein strips • Rose Bengal stain • Sterile water vials • Syringe • 26-gauge needle • Pachymeter • Gonioscope • Optical coherence tomography • A-Scan • Ultrasound bio microscopy	• Topography/Pentacam/Orbscan • Specular microscope • Aberrometer • Fundus camera • AS OCT • Electroretinogram (ERG) • Visually evoked potential (VEP)

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behaviour**
1. Ability to obtain relevant history	• Understanding the need to gather adequate information from the patient and from their previous records.	• Recognise and verify the situations where relevant information is incomplete, inaccurate, or biased • Collect, Integrate, and interpret information from clinical tests performed by other professionals.	• Establish eye contact, rapport and remain an active listener.
2. Ability to assess the eye and ocular adnexal regions	• Extensive knowledge on the normal and abnormal structure, health and functional ability of the eye and its adnexal regions. • Extensive knowledge on the use of various instruments or techniques such as, but not limited to. • Slit lamp bio microscopy. • Direct ophthalmoscopy	• Should assess and evaluate the eyelids, lacrimal gland, tear film conjunctiva, cornea, anterior segment, lens, posterior segment, ocular surface, and skin lesions near the eye.	• Be proficient, safe, and accurate with the use of equipment and in the performance of techniques. • Provide clear explanation of the purpose of various tests, procedures and diagnostic pharmaceuticals used

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	• Indirect ophthalmoscopy • Colour vision • Amsler testing • In-depth knowledge in interpreting the results of the various tests and manage or refer the patients appropriately.	• Should be competent in evaluating the various structures using slit lamp bio microscopy, direct or indirect ophthalmoscope. • Should use appropriate diagnostic pharmaceuticals for the evaluation. • Demonstrate the ability to manage and /or refer the patients appropriately	
3. Ability to perform and interpret corneal diagnostics	• Extensive knowledge on the instrumentation, and indications of various corneal diagnostics	• Demonstrate proficient use of topographer/Penta cam/orb scan, specular microscope, pachymeter, aberrometer, AS OCT and/or UBM • Demonstrate the ability to perform pre and post Lasik evaluation	• Keep the patient well informed about the various procedures and ensure he/she understood before you do the procedures. • Demonstrate patience while performing various procedures on the patients and explain the findings.

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			• Ensure whether patient and the attender got their doubts cleared before they leave the clinic
4. Ability to perform and interpret glaucoma diagnostic.	• Extensive knowledge on the instrumentation, and indications of various glaucoma diagnostics • In-depth knowledge on the normal and abnormal results of various diagnostic testing.	• Demonstrate adequate ability in performing applanation tonometry. • Demonstrate adequate ability to perform and document the findings of gonioscopy and optic nerve head evaluation • Demonstrate ability to perform various diagnostic testing such as perimetry, OCT, HRT, GDx • Demonstrate the ability to make evidence based clinical decision and analyse the progressions.	• Communicate proficiently in the patient's preferred language of the pros and cons of the testing. • Patiently clarify the doubts and fear related to the test performed. • Phrase/rephrase questions and answers to facilitate interactive communication and enhance and verify understanding • Ensure whether patient and the attender got their doubts cleared before they are performing the test

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5. Ability to perform and interpret ophthalmic photography and imaging	• Extensive knowledge on the instrumentation, and indications of various ophthalmic imaging techniques • In-depth knowledge on the effects and adverse effects of the drugs used for imaging. • In-depth knowledge on the normal and abnormal findings of the diagnostic tests	• Demonstrate the ability to take stereo fundus photographs. • Demonstrate the ability to capture the movement of the dye during fundus fluorescein angiography and Indocyanine green angiography. • Demonstrate the ability to perform optical coherence tomography and interpret the results of the study	• Establish patient's identity. • Communicate proficiently in the patient's preferred language of the pros and cons of the testing. • Patiently clarify the doubts and fear related to the test Performed. • Phrase/rephrase questions and answers to facilitate interactive communication and enhance and verify understanding. • Ensure whether patient and the attender got their doubts cleared before they are performing the test
6. Ability to perform and interpret electrodiagnostic testing	• Extensive knowledge on the instrumentation, and indications of various electrodiagnostic tests.	• Demonstrate the ability to prepare the patient for electrodiagnostic testing.	• Communicate proficiently in the patient's preferred language of the pros and cons

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	• In-depth knowledge on the normal and abnormal findings of various electrodiagnostic testing	• Demonstrate the ability to identify appropriate electrodes and fix them at right places according to the type of testing. • Demonstrate the ability to run various electrodiagnostic strategies and interpret the results of the tests	of the testing. • Patiently clarify the doubts and fear related to the test performed. • Ensure whether patient and the attender got their doubts cleared before they are performing the test
7. Ability to perform diagnostics and develop management protocol for Ocular surface disorders	• In-depth knowledge on the instrumentation, and indications of various ocular surface diagnostic procedures and techniques.	• Demonstrate proficient use of various staining techniques, meibography, lipid layer interferometry. • Demonstrate the ability interpret the results of the testing.	• Be proficient, safe, and accurate with the use of equipment's and the performance of various techniques. • Provide clear explanation of the purpose of various tests, procedures.
8. Ability to perform diagnostics and develop management protocols for control of myopia progression	• In-depth knowledge on the progression of myopia and the necessity to control it	• Demonstrate the ability to perform axial length measurement.	• Keep the patient well informed about the progression and the resulting complications of myopia.

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		• Demonstrate the ability to measure corneal curvature, accommodation, and peripheral refraction • Demonstrate the ability to interpret the results of the testing. • Demonstrate the ability to manage/co-manage and/or refer the patients appropriately.	• Demonstrate patience while performing various procedures on the patients and while explaining to them about the findings and always seek the full cooperation of the patients. • Ensure whether patient and the attender got their doubts cleared before they leave the clinic

ADVANCED CONTACT LENS

Description: Ability of the optometrist to elicit relevant history, perform necessary diagnostic tests and ascertain appropriate type of contact lenses. Optometrist should be able to fit and dispense various types of contact lenses, counsel the patients, manage after care and manage / co- manage patients with the other specialists when required.

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Required instruments and tools

Must Haves		Desirables
• Torch light • Keratometer • Slit lamp bio-microscope. • Fluorescein strips • Wratten filter • Contact lens trial sets. -Scleral, Orthokeratology, Rose'K	• Disposable multifocal trial lenses (soft) • Area to teach lens insertion and removal. • Mirror • CL solutions, Saline • Hand towels/tissues • Wash Basin • Topographer	• Burton lamp • Infographics and written instruction

Performance criteria	Indicators		
	Knowledge	Skill	Behaviour
Ability to ensure patient safety in contact lens practice	• Understanding of various contact lens solutions and their interactions with distinct types of lenses and materials • Awareness of numerous ways of disinfecting contact lens trial sets to make them safe for usage • Understanding of various microbes that may cause issues with lens wear and how to eliminate them	• Demonstrates proper contact lens cleaning and disinfecting steps using various cleaners and even lab cleaners • Makes and follows a disinfecting routine of all trial sets conscientiously	• Prioritize patient's safety

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Ability to assess the suitability of contact lenses as a form of correction for a patient and counsel the patient accordingly	• Awareness of how the lifestyle, vocational needs, vision, refraction, comfort, duration of wear, environment affects contact lens wear • Knowledge and understanding about the ocular physiology and systemic diseases and their interaction with contact lens materials/types • Ability to spot risks contraindicated to contact lens wear and knowledge to reduce these risks by taking appropriate actions • In depth knowledge of all contact lens materials and lens.	• Elicits proper history that is relevant for contact lens wear based on the understanding of theory • Assesses ocular integrity and physiology (using slit lamp, Keratometer, vital staining, tear function tests) and correlate them to the history to conclude the type of lens design and material to be prescribed • Counsels the patients regarding probable risk factors, if any and what steps need to be taken to make contact lens wear safe • Recommends right lens using professional expertise	• Be a good listener and ask probing questions without intimidating the patient • Should be polite and understanding yet be confident and assertive when conveying the lens choice • Confident and efficient in performing tests
Ability to select, fit and order the most appropriate rigid gas permeable contact lens (including Rose K lenses) based on patient's	• Detailed knowledge of the range of rigid lens materials and designs available • Understanding of all the parameters, range of Base curve, diameter, and power availability of various RGP CL companies that are available	• Makes the appropriate choice of rigid lens parameters – Back vertex power, base curve, total diameter, optic zone diameter, design, material etc. • Assesses the fitting of a rigid lens – Dynamic and static (understands and interprets fluorescein patterns)	• Be empathetic towards any discomfort patient experiences.

refraction, visual requirements, and other findings	• Knows how to modify the parameters of various RGP CL to obtain an appropriate fit • Knowledge of how to assess fluorescein pattern and the influence of lids on the RGP fit • Knowledge about RGP lenses used in specialty fitting such as Keratoconus, OrthoK, scleral lenses, mini scleral lenses	• Makes appropriate adjustment in lens parameters for best fit. • Writes an appropriate order for a rigid lens	
Ability to instruct the patient in Rose K lens handling, how to wear and care for them	• Understanding of the rigid lens care systems- Disinfectants, intensive cleaners etc. • Knowledge to instruct the patient on how to insert and remove Rose K CL. • Awareness of the complications in case of a non-compliant patient	• Instructs the patient in the techniques of Rose K lens insertion, removal, and other relevant handling instructions • Instructs a patient on the principles of Rose K lens wear and care including the use of RGP/Rose K lens care products, Do's, and Don'ts • Explain importance of hand hygiene and lens case hygiene	• Be patient while instructing and while the patient is learning how to use CL • Do not intimidate the patient while teaching how to handle the CL. • Be firm and professional while delivering instruction for CL care.
Ability to manage the aftercare of patients wearing rigid lenses	• Understanding of rigid lens (rose K) adaptation and aftercare issues and how to manage them • Knowledge of the content and routine of a rigid CL (rose K) aftercare consultation	• Conducts the relevant tests and assessments which are required in a routine rigid lens/rose K aftercare consultation	• Observation skills as you elicit history of patient and complaints if any

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		• Schedules appropriate timelines for after care • Analyses the care regimen that the patient is following and correlate with what was prescribed • Asks probing questions to patient in terms of how he/she handles and takes care of CL • Requests patient to demonstrate cleaning procedure in front of the practitioner	
Ability to manage astigmatic patients with contact lenses	• Knowledge of the types of astigmatism • Understanding of the designs and materials available in toric contact lenses	• Chooses the appropriate type of CL correction to meet the relevant needs of the patient • Assesses the fit and orientation and makes appropriate adjustments in the final prescription – (application of LARS /CAAS rule in toric lenses)	• Explain the need for such a lens and the benefits of the same to patient.
Ability to manage presbyopic patients with contact lenses	• Understanding of presbyopia • Knowledge of various modes of correction for presbyopia such as single vision, multifocal lenses	• Explains to the patient diverse options that are available in correcting presbyopia with CLs and explains their benefits to enhance the lifestyle of the patient.	• Active listening, probing, and counselling

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	• Understanding of ocular dominance and troubleshooting in case patient is dissatisfied with the outcome	• Chooses the appropriate type of CL correction to meet the relevant needs of the patient • Assesses fit, vision and modifies the prescription/fit if necessary.	
Ability to prescribe contact lenses in pediatric.	• Demonstrates an understanding of conditions requiring paediatric contact lenses. –Aphakia, Aniridia; trauma; amblyopia etc • Knowledge of materials, parameters, and availability of paediatric lenses • Knowledge of fitting, aftercare, and complications of these lenses	• Makes appropriate choice of lens parameters –base curve, total diameter, material, tint etc. • Accurately assesses the fit of the lens • Recommends appropriate after care schedule	• Empathetic towards patient during the entire procedure • Shows patience and confidence while smoothly manoeuvring through various steps
Ability to select, fit and order the most appropriate speciality contact lens like scleral lens, hybrid lenses and Rose K based on patient's refraction, visual requirements, and other findings	• Knowledge of various conditions that can be managed by specialty contact lens like sclera's, hybrid, and Rose K • Knowledge of materials, parameters, and availability of scleral, hybrid and speciality GP lenses • Knowledge of fitting, aftercare, and complications of these lenses	• Manage the conditions that require specialty contact lens fitting - Keratoconus, irregular corneas, dry eye, post refractive surgery etc.	• Empathetic towards patient during the entire procedure • Shows patience and confidence while smoothly manoeuvring through various steps

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LOW VISION CARE AND VISUAL REHABILITATION

Description: After completing the course, the student should be able to understand epidemiology of vision impairment ,various ocular diseases pathology that lead to vision impairment, clinical and functional visual performance evaluation with internationally accepted standard equipment, magnification, psychosocial consequences of vision impairment, design optical & lighting environment modification for visually impaired, sensory substitution devices, counselling, orientation & mobility training for visually impaired and understand the role of a multidisciplinary team involved in vision impairment & rehabilitative care.

Required instruments and tools

Must Haves		Desirables
• Self-illuminated Log MAR chart (ETDRS) for distance • The Berkeley Rudimentary Vision Test • Cardiff Acuity Test • Bailey lovie word reading chart for nearby. • Minnesota Low vision Read Acuity Chart for reading speed, acuity etc. • Full Aperture trial box and Universal Trial Frame • Vistech VCTS chart / Evans/ Pelli Robson • Low contrast visual acuity chart • Pelli-Robson low contrast letter chart • Hiding Heidi low Contrast Face Test • Berkeley central visual field test (BCFT) • Hand Disc Perimeter	• Brightness Acuity test (BAT)Ophthalmoscope for photostress recovery time • D-15 Farnsworth test • Electronic Low vision devices (CCTV systems) • Non-Optical devices (Writing guide, Reading stands etc.) • Absorptive Filters • Eccentric viewing practise charts • Prisms • Field Expanders • White cane • Braille alphabet Tiles • Software program for Computer usage (JAWS-Job Access WorkStation) • Large Print Books	• Catford drum • Teller Acuity Cards for children VA assessment • Laser Cane • OPtical to TActile CONverter • Artificial iris contact lens • Typoscope with fixation point for eccentric viewing training

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Performance Criteria	Indicators		
	Knowledge	**Skill**	**Behaviour**
Ability to diagnose and manage patients with vision impairment	• Understand how different ocular diseases impact visual functions • Knowledge of aids to manage visual acuity loss, visual field defects, contrast loss, and colour deficiencies.	• Utilise standard instruments to assess visual performance. • Assess visual performance in adults and children with vision impairment.	• Be empathetic. • Be kind and patient. • Consciousness and attention to detail
Ability to perform specialised diagnostics for patients with low vision with multiple. disabilities	• Management for multiple disabilities. • Knowledge of procedure of speciality tests of visually impaired.	• Ability to perform the Berkeley Rudimentary Vision Test, MNREAD test, Vistech VCTS test, BCFT, BAT etc.	• During every step, demonstrate empathy for the patient.
Ability to train for eccentric viewing and steady eye techniques	• Knowledge of prism relocation therapy, Eccentric viewing.	• Ability to determine preferred retinal locus • Ability to provide eccentric training.	• Be calm • Be empathetic.

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Ability to suggest environment modification and absorptive filters for visually impaired	• Knowledge of lighting and layouts to avoid obstacles	• Ability to design optical & lighting systems for visually impaired	• Consciousness and attention to detail
Ability to rehabilitate patients with VI with vocational counselling and activities of daily living	• Knowledge of orientation & mobility • Knowledge of benefits for visually challenged.	• Ability to provide orientation and mobility training. • Ability to provide counselling. • Ability to provide daily living activities training specific to their quality of life	• Be nonjudgmental.

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VISION THERAPY

Description: The course will aim to help expand the student's knowledge base in all aspects of behavioural vision care and optometric vision therapy. Advanced competencies are expected to be achieved in understanding the principles and procedures used in diagnosing and treating with optometric vision therapies, behavioural vision care, perceptual therapies, and neuro vision rehabilitation therapies.

Required instruments and tools

Must Haves		Desirables
All the equipment mentioned in IELOCS for binocular vision Advanced vision therapy kit comprising of • WFDT light torch white • Dual polachrome illuminated trainer. • Variable prismatic trainer (attaches to Bernelloscope) • Mirror stereoscope in office set • TV kit large • Life saver cards set. • Fixed demand tranaglyph kits • Variable demand tranaglyph kits • Vectograms • Eccentric circle card set. • Aperture rule kit • Tranaglyph V/H • Barrell convergence card set. • Bernell O Scope with case • Accommodative flippers (+/- 0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.50)	• Single Brock string • Vergence facility stick Saccadic stick • Saccadic card set. • Haart chart • Rock card set. • DEM complete test set • Peripheral charts • Polarized bar readers • Red/green bar readers • Prism goggles adult 4 and 8D • Floor rotator • Walking rail • Balance board • TVPS 4 • Workbooks for perceptual therapies • Parquetry blocks • Marsden ball • Large magnetic white board • Loose uncut lenses of different power	• DTVP 4 • Beery Buktenica VMI • Computer based software. • MIT2 • VR based software. • Readalyzer • Visagraph • Red – red rock

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Performance criteria	Indicators		
	Knowledge	**Skill**	**Behaviour**
Ability to understand principles used in therapy techniques and procedures.	• In depth knowledge of the principles and procedures of vision therapy procedures • The epidemiological and demographic characteristics of binocular vision disorders • The characteristic history, signs, and symptoms for each clinical condition • Knowledge of binocular vision conditions, including specific test protocols and their interpretation • The differential diagnosis for binocular vision conditions Specific treatment and management of each clinical condition including: • Prognostic indicators • Knowledge of the treatment options, duration, and frequency of treatment • Treatment philosophy and goals • Knowledge of lens treatment and therapy procedures including rationale for treatment	• Assessment of binocular vision conditions and specific test protocols. • Procedures involved in the treatment of anomalies of binocular vision. • Training the patient and or/the caregiver in therapy procedures for home therapies. • Explaining the problem/s, treatment modalities and prognosis to the patient and or/the caregiver.	• Able to establish eye contact, and rapport with the patient. Allows the patient/care giver to speak initially and remain an active listener. • Should have a good observation and analytical, capacity to notice and interpret small changes in the movements of the eyes and body while performing the tests. • He/she must have patience to carry out the tests and repeat them if required. Should be able to explain and clarify the questions confidently and adequately. • The examiner should be confident, adaptable, and culturally sensitive towards the patients. • Should be empathetic towards the patient and understand their difficulty if they are not able to perform any procedure adequately.

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	• 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.)		
Ability to understand diagnose and provide optometric vision therapies for various clinical conditions.	In depth knowledge of the causes, treatment options and prognosis for the following: **A.** Strabismus and Amblyopia: i. Amblyopia – all the types ii. Strabismus – all the types iii. Sensory adaptations **B**. Knowledge of visual and neurological growth and development **C.** Knowledge of perception and information processing in the following: i. Neurological / Psychological	1. Diagnostic and various therapeutic modalities in treatment of strabismus and amblyopia. 2. Performing all the diagnostic tests involved in assessment of visual information processing 3. Performing all the tests assessing visual motor coordination, bilateral integration, laterality, and directionality 4. Assessment and evaluation of population with special needs. 5. Assessment and evaluation of patients with brain injuries.	1. Determine the level at which patient performs easily. 2. Be aware of the frustration levels of the patient. 3. Use positive reinforcements with the patient while performing therapies. 4. Maintain an effective training level. 5. Set realistic therapy objectives and maintain flexibility with these objectives and end point

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	ii. Intercessory and Sensorimotor Integration Understanding and knowledge of performance indicators like: a. Laterality and directionality b. Visual requirements for academic success c. Bilaterality d. Gross and fine motor ability e. Form perception/visual analysis f. Spatial awareness g. Visualization h. Visual memory i. Visual sequential memory j. Form constancy k. Visual speed and visual span l. Visual sequencing D. Knowledge and understanding of refractive conditions and visual skills: a. Refractive Conditions b. Ocular Motor	6. Formulating a plan and to treat conditions like: • Strabismus • Amblyopia • Visual perceptual disorders • Visual motor disorders • Disorders emanating from neural injuries and insult. • Learning related vision disorders • Oculo – Musculo – skeletal disorders like computer vision syndrome • Sports injuries and visual performance disorders	

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	Function like: i. Eye movements and reading ii. Pursuit dysfunctions iii. Nystagmus iv. Saccadic Dysfunctions c. Accommodation d. Fusion in Non-Strabismic Conditions E. Understanding of causations, therapeutic procedures, and prognosis in special clinical conditions like: 1. Acquired brain injury (traumatic brain injury {TBI} and stroke) 2. Developmental disabilities (Down Syndrome, Developmental delay, etc.) 3. Visually induced balance disorders 4. Motor disabilities (Cerebral Palsy, ataxia, etc.) 5. Behavioural disorders 6. autism spectrum disorder 7. ADD / ADHD		

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	8. Dyslexia and specific reading disabilities 9. Learning disabilities 10. Computer vision syndrome		
Ability to understand, define and explain several vision therapy concepts	Complete knowledge and understanding of the following concepts and feedback mechanisms used in optometric vision therapy. a. Peripheral awareness: focal / ambient roles. b. Significant findings which are good or poor prognostic indicators of vision therapy and lens application c. Behavioural lens application d. Yoked prism rationale for treatment and application e. The relationship between the visual and vestibular systems f. Concepts of SILO/SOLI g. Visual stress and its impact on the visual system h. Role of posture in vision development, comfort, and performance i. Relationship of speech-auditory to vision	1. Demonstration of all feedback mechanisms to the patient 2. Making the patients understand where they are going wrong in performing the tasks while 3. Performing the feedback tests. 4. Helping the patient to rectify the performance errors and ultimately achieving the desired goals and objectives. 5. Supporting the patient by explaining to him the purpose and principles of optometric vision therapies.	1. Should be patient and not be in a hurry to achieve results. 2. Be empathetic towards the patient and encourage the patient if he is unable to do any procedure. 3. Maintain a good communication level with the patient and the attendant. 4. Should be confident in everything.

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	j. How television, reading, video gaming might, restricted movement, computer work, nutrition, etc., impact vision? k. Perceptual Style, e.g., spatial/temporal, central/peripheral	6. Getting the patients to understand that the equipment is only to provide targets and quantification tools, whereas the changes happen within the visual and neurological system of the patient.	

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PEDAGOGY

Description: The course will aim to develop competencies to become effective teacher/ instructor in optometry program by imparting knowledge and skills of health professions education. The main objective is to develop the teaching and assessment capabilities of the candidates. Candidates are expected to possess and exhibit cognitive abilities, which include comprehension, analysis, evaluation, understanding the structure of arguments, deductive and inductive reasoning. The candidates are also expected to have a general awareness about teaching and learning processes in higher education system, with focus on medical and health professional education.

Required tools: Classroom/ clinical setup for teaching, course curriculum for experimentation.

Performance criteria	**Indicators**		
	Knowledge	**Skill**	**Behavior**
Ability to frame learning objectives of a course in alignment with program objectives.	• Has basic knowledge of learning taxonomy, SMART objectives? • Knowledge of steps to frame the learning objectives. • Knowledge of various types of curricula	• Demonstrate the ability to frame learning objectives for the course/program. • Aligns the course objectives with the program objectives	• Awareness about roles and responsibilities of optometrist in general and speciality optometry practice
Ability to design learning and assessment modules for the given course.	• Knowledge of principles of adult learning • Knowledge of various components of instructional design, models, and strategies,	• Proficiency in learner analysis • Designs an instructional module for given learning objective. • Finds resources and develops study material for a given module.	• Learner centric approach • Communication and teamwork • Organisational skills • Analytical thinking

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	• Knowledge of Various teaching-learning and assessment methods • Familiarity with cognitive and developmental psychology	• Defines measurable learning outcomes	
Ability to impart the instructional module to achieve learning objectives.	• (pre-requisite) In depth knowledge of the subject assigned to teach. • Understanding of different types of learners and learning environment and factors that contribute to learning. • Knowledge of Various teaching-learning methods • Use of technology in delivery of modules • Knowledge of bed side/ clinical teaching methods • Knowledge of evidence-based teaching.	• Demonstrates strong communication skills. • Implements various teaching assignments using appropriate technological solutions. • Ability to conduct demonstration of various lab experiments / clinical tests. • Demonstrates ability of evidence-based teaching	• Critical thinking and problem-solving ability. • Collaborative working in team • Care and inclusiveness • Flexibility and adaptability in different learning environments • Cultural sensitivity • Role model behaviour

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Ability to choose the form and conduct assessment for the given course.	• Knowledge of summative and formative assessments • Knowledge of various assessment tools • Understanding of performance criteria • Knowledge of assessment reports and feedback	• Analytical skills to judge the performance against given criteria. • Ability to communicate with the students during and after the assessment. • Demonstrates reporting of assessment. • Gives constructive feedback to students explaining outcomes of assessment.	• Unbiased / neutral behaviour • Analytical skills • Flexible approach of communication, appropriate for pre assessment, during assessment and post assessment sessions
Ability to reflect on the academic processes by analysing learner's feedback and program outcomes.	• Knowledge of different models of program evaluation • Knowledge of different models of feedback • Knowledge of channels/ tools of data collection • Knows basis statistics to draw results from data. • Understanding of various delivery channels/ tools to give feedback / reports.	• Designs a student's feedback questionnaire. • Performs statistical Analysis of data collected. • Generates a report for effectiveness of given course	• Constructive and collaborative approach • Curiosity • Life-long learning skills

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Chapter 6

Job description

Chapter 6: Job description

Job Title: Optometrist, Assistant Manager Professional Services, Tutor/Clinical Instructor, Scientist-B

Job Purpose: Primary Eye care practitioner: Diagnose eye ailments by performing a comprehensive eye examination. Comprehensive eye examination will include:

a. Detailed history (ocular and general)
b. Collecting and maintaining all demographic data of patient (Name, age, occupation, address)
c. Vision check
d. Refraction (objective, subjective)
e. Binocular balancing
f. Ocular motility tests
g. Slit lamp examination
h. Intra-ocular pressure check
i. Use diagnostic medications namely, mydriatrics and cycloplegics (in indicated patients only)
j. Fundus examination
k. Prescribing spectacles/Contact lenses/low vision devices wherever required
l. Refer or co-manage patient wherever appropriate
m. Perform all diagnostic tests, treat certain eye ailments that fall within their scope of practice, prescribe spectacles, contact lenses, low vision aids.
n. Manage primary and secondary health care centres independently

Accountable to: Self-employed, report to senior optometrist in case of institutional set up, report to medical officer in case of PHC or CHC. If employed in Industry, will report to department in charge/CEO of the industry.

Qualification: Refer to table

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Job Title: Consultant Optometrist, Manager Professional Services, Assistant Professor, Scientist-C

Job Purpose:

a. Academic: Teaching optometry subjects to undergraduate level
b. Research: Conducting independent clinical research studies
c. Clinical instructor to undergraduates
d. Private practice or primary eye care practitioner: Same as Level 10. In addition dispense speciality contact lenses, perform vision therapy, and set up speciality clinics.
e. Industry: Professional services, training for staff and practitioners.
f. Public health officer

Accountable to: Self-employed, report to senior optometrist in case of institutional set up, report to medical officer in case of PHC /CHC/DH. If employed in Industry, will report to department in charge/CEO of the industry. In academic settings will report to the principal.

Qualification: Refer to table

Job Title: Consultant Optometrist (Senior Scale)/Superintendent Optometrist, Assistant Professor (Senior Scale), Scientist-D

Job Purpose:

a. Academic: Teaching optometry subjects to undergraduate level and post graduates level
b. Research: Conducting independent clinical research studies and also be a guide to undergraduate postgraduate projects.
c. Clinical instructor to both undergraduate and post graduates
d. Private practice. Independently run clinics in institutions. Provide training to undergraduate and postgraduates in institutions.
e. Industry: Head of professional services
f. Public health project manger

Accountable to: Self-employed, report to senior optometrist in case of institutional set up, public health report to medical superintendent. If employed in Industry, will report to CEO of the industry. In academic settings will report to Dean of the institute.

Qualification: Refer to table

Job Title: Senior Consultant Optometrist, Associate Director Professional Services (country), Associate Professor, Scientist-E

Job Purpose:

a. Academic: Teaching optometry subjects to undergraduate level and post graduates level
b. Research: Conducting independent clinical research studies. Guide undergraduate and post graduates in their research projects. Setting up of independent research labs or clinical trials.
c. Clinical instructor to both undergraduate and post graduates
d. Private practice or primary eye care practitioner:
e. Industry: Associate Director- Country level
f. Incharge of public health projects.

Accountable to: Self-employed, report to medical director or chair in case of institutional set up, report to medical superintendent in public sector. If employed in Industry, will report to CEO of the industry. Academic: report to Dean.

Qualification: Refer to table

Job Title: Chief Optometrist, Associate Director Professional Services (Group of countries), Associate Professor-Senior Scale, Scientist-F

Job Purpose:

a. Academic: Teaching optometry subjects to undergraduate level and post graduates level
b. Research: Conducting independent clinical research studies. Guide undergraduate and post graduates in their research projects. Setting up of independent research labs or clinical trials.
c. Clinical instructor to both undergraduate and post graduates
d. Private practice or primary eye care practitioner:
e. Industry: Associate Director- Group of Countries
f. Incharge of public health projects.

Accountable to: Self-employed, report to medical director or chair in case of institutional set up, report to medical superintendent in public sector. If employed in Industry, will report to CEO of the industry. Academic: report to Dean.

Job Title: Head of Optometry, Director Professional Services (Country or Group of countries), Professor/Principal, Scientist-G/Research Head

Job Purpose:

a. Academic: In charge of running graduate and postgraduate course. Teaching optometry subjects to undergraduate level and post graduates level
b. Research: Conducting independent clinical research studies. Guide undergraduate and post graduates in their research projects. Setting up of independent research labs or clinical trials.
c. Clinical instructor to both undergraduate and post graduates
d. Private practice or primary eye care practitioner: level 6 and above
e. Industry: Director Professional Services (Country or Group of countries),
f. Associate Director: public health projects.

Accountable to: Self-employed, report to medical director or in case of institutional set up, report to medical superintendent in public sector. If employed in Industry, will report to CEO of the industry. Academic: report to Dean.

Qualification: Refer to table

Job Title: Director-Optometry, Vice President Professional Services, Principal/Dean, Additional Director General

Job Purpose:

a. Academic: Principal of graduate and post graduate courses. Dean of college Teaching optometry subjects to undergraduate level and post graduates level
b. Research: Conducting independent clinical research studies. Guide undergraduate and post graduates in their research projects. Setting up of independent research labs or clinical trials.
c. Clinical instructor to both undergraduate and post graduates
d. Private practice or primary eye care practitioner: level 6 and above
e. Industry: Vice President Professional Services
f. Director: public health projects.

Accountable to: Self-employed, report to medical director or in case of institutional set up, Public sector: report to director. If employed in Industry, will report to CEO of the industry. Academic: report to Dean/Director of the Institute.

Qualification: Refer to table

Minimum Standard Requirement (MSR)

Bachelor in Optometry program

All existing OPTOMETRY colleges/ institute or A new Optometry college will impart Optometry education is suggested the following conditions are fulfilled:-

1) Infrastructural, Functional & Equipment and human resource Requirements

The establishment of an Optometry college – No person shall establish a Optometry college/institute except after obtaining priorpermission from the National commission (NCAHP). Optometry education prepares a person for independent practice and involves extensive clinical training in almost every speciality & super speciality of ocular health care.

The following organizations shall be eligible to apply for permission to set up a Optometry college, namely: -

1. A State Government/Union territory;
2. A University and Deemed to be University,
3. An autonomous body promoted by Central and State Government by or under a Statute for the purpose of medical education;
4. A society registered under the Societies Registration Act, 1860 (21 of 1860) or corresponding Acts in States; or
5. A public religious or charitable trust registered under the Trust Act, 1882 (2 of 1882) or the WAKFS Act, 1954 (29 of 1954).
6. Companies registered under Company Act may also be allowed to open Optometry colleges.

2) **LAND AND BUILDING –**

i. If the college is in the premises of NMC permitted/ recognized medical college, no separate land is required. Existing norms of land for medical college will suffice. Besides that the constructed area/Building norms for Optometry College must be fulfilled as per the requirement mentioned below. In all other cases, the applicant must provide the land details on which the institution will be established for providing Optometry education. It should be in the name of society/ Trust/company applying for the same (sale deed/lease/gift deed etc.).

ii. That the applicant Institution / Trust should have an independent building for Optometry College and facilities for clinical training as per the curriculum as prescribed by the commission from time to time.

iii. Such a building should be constructed in such a way that there is adequate parking space and recreational area or open space for students as prescribed by the commission.

iv. Such a building should have adequate space and should have out-patient Optometry department, various laboratories as needed, office space, class rooms, hostel and other ancillary facilities. Optometry OPD and the college can be placed in different buildings within 50 KM (or as per the NCAHP regulations) distance in the same state of India.

v. Minimum exclusive built up area for such a college should be 26675 sq.ft for an intake of 30 students per batch and 35750sq.ft for the intake of 60 students per batch.

vi. Building should be barrier free accessible to persons with disability and as per NBCI guidelines (National Building Code of India).

vii. Building must be recorded on the appellate institute name or if the land is under lease agreement, it must be for at least 10 years

viii. Building must have requisite clearances from the respective civic and administrative authorities' like - Fire NOC, structural stability cer tificate, land use certificates etc.

ix. Building must have CCTV camera for CCTV surveillance for every area of common use as can be prescribed.

x. Biometric facility for students and staff, faculty attendance record/documentation

3) Optometry Departments

A well-equipped OPD facility in Optometry department with instruments of all specialties like Contact Lenses clinic, Low Vision clinic, Binocular vision/Vision Therapy clinic, Ocularistry Myopia clinic, Sports vision clinic etc should be available at the college premises. A student/ patient ratio of 1:5 should be maintained. That means a hospital with 100 OPD can have a maximum intake of 20 students per year. In addition to the own Optometry OPD in the college building (in case of the existing institutions) if required, the College can get attachment (through signed MOUs) to maximum 5 Optometry departments/ OPDs in various hospitals with minimum 50 patients OPD workload per day. An out-patient Optometry department at the tie-up facility cannot be considered as an independent Optometry OPD/ unit of the college. Besides the Optometry OPD at the campus, the institute should also start a community / extension centre in nearby rural /semi urban area.

4) HOSPITAL / HOSPITAL ATTACHMENT –

If the college is in the premises of MCI/NMC permitted/recognized Medical College as constituent college, then, there is no requirement for attachment of any other hospital.

a. In all other cases Proof of availability of own/attached hospital (Government/Private) for clinical training of 30 students shall be furnished (student: OPD ratio of 1:5). The hospital must be within 20 km radius of the College. College must provide mandatory bus service to the students if the hospital is located more than 1 km away from the College. Within 5 years of application of these Rules, the colleges must have Own Prescribed Hospital in the college Premises.

b. College can be affiliated to maximum five (05) hospitals having indoor and outdoor facility in the above mentioned specialty clinics.

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c. Tie up hospitals cannot get attached to more than two colleges. If the affiliated hospital is attached with two colleges, the OPD strength must be adequately divided amongst the colleges as per the prescribed student: OPD ratio.

d. The affiliated hospital shall provide information regarding any MOU with other colleges, if any & MOU should be for at least five years.

e. The MOU should mention the available clinical specialties, patient loads, and availability of required equipment for clinical training with names and designations of the faculties responsible for the training in the hospital.

f. FACULTY: The college/institute must arrange for Optometry faculty members for supervision and clinical teaching of students inside the hospital. This can be done either by posting its own Optometry faculty members in the hospital or making remunerative arrangement for recruiting Optometry faculty members of the hospital.

g. Hospitals may recruit its faculty members of Optometry for supervision and clinical training of Optometry students and supervision of Optometry interns with similar eligibility, pay scales and promotional avenues of Optometry institutes.

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5) Space allotment for an annual intake of 60 students of Bachelors in Optometry

Infrastructure requirement for the college

S.No	Details	Total number required	Area required per student in Sq.ft	For 30 students	For 60 students
1	Classrooms	4+1=5	10	1500	3000
2	Optics Lab	1	20	600	1200
3	Biochemistry lab	1	20	600	1200
4	Anatomy lab	1	20	600	1200
5	Clinical labs	2	20	1200	2400
6	Library	1	30	900	1800
7	Common room for girls	1	10	300	600
8	Common room for boys	1	10	300	600
9	Auditorium	1	-	7500	7500
10	Principal room	1	-	500	500
11	Admin room	1	-	500	500
12	Faculty room	1	-	1000	2000
13	Guest faculty room	1	-	500	500
14	Waiting/Lounge area	1		500	500
15	Toilet for girls	1	-	500	1000
16	Toilet for boys	1		500	1000
17	ECR room	1	-	350	350
18	Store room	1	-	250	500
19	Pantry	1		150	150
			Total	18250	26500

Infrastructure requirement for Optometry Clinic

S.No	Details	Total number required	Area required in Sq.ft
1	Contact lens clinic	1	500
2	LVA clinic	1	500
3	BV/VT clinic	1	500
4	Ocularistry	1	500
5	Myopia Clinic	1	500
6	Sports vision clinic	1	500
7	Reception area	1	500
8	Patient waiting area	1	1500
9	Toilet for Women	1	500
10	Toilet for Men	1	500
		Total	**6000**

- Total area required for Optometry college for 30 intake is 18250 + 6000 + Plinth 10% = 26675 Sq.ft
- Total area required for Optometry clinics for 60 intake is 26500 + 6000 + Plinth 10% = 35750 Sq.ft

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Chapter 6.1: Minimum Infrastructure Recommendation or MSR for Optometry College for the batch of 30 students

1. Classrooms (4)
    a. Minimum number of classrooms -4
    b. Size of each classroom: 10 Square feet per student (10X30= 300 Sq. ft)
2. Basic Science lab: (3)
    a. Optics lab: 20 square feet per student (20X30= 600 Sq. ft)
    b. Biochemistry and physiology lab: 20 Sq. ft per student)
    c. Anatomy lab: 20 square feet per student (20X30= 600 Sq. ft)
3. Clinical Lab: (2)
    a. Size: 20 Sq. ft per student (20X30 = 600 Sq. ft)
    b. One room for Refraction Lane: 6 lanes for 30 students
    c. One room for lanes on Contact lens, Binocular vision and low vision clinic
4. Library: (1)
    a. 30 Sq. ft per students (30x30= 900 Sq. ft)
5. Common Room for girls- (1)
6. Common Room for boys- (1)
7. Auditorium (optional)- (1)
8. Principal and Administration office: Two rooms of 500 sq. ft.
9. Faculty room: One room of 500 sq. ft.
10. Computers: Twenty Desktop computers with necessary software applications

Clinical infrastructure

A school of optometry should have an attached clinic/hospital to cater to the clinical learning. Every student, irrespective of the year of the programme he/ she is enrolled in, is expected to examine (under supervision in the first three years) at least 5 patients per day on the days of clinical postings as prescribed in the curriculum.

Minimum Equipment (for 30 students) for the B Optom program

1. Distance vision drum: (6)
2. Trial set: (6)
3. Streak retinoscope*(6)
4. Keratometer: (6)
5. Lensometer: (6)
6. Slit lamp: (6)

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7. Applanation tonometer: (6)
8. Direct Ophthalmoscope*(6)
9. Indirect Ophthalmoscope: (3)
10. Non-mydriatic fundus camera-(1)
11. Color vision test (Ishihara)- (3)
12. Contact lens

    RGP contact Lens kit - 3 sets comprising choices of base curves and powers

    Disposable Soft contact lenses kit-3 sets comprising choices of base curves and powers
13. Low Vision

    Log MAR chart (Distance and Near) -(1 each)

    Contrast Sensitivity chart-(1): Pelli-Robson CS chart

    Optical low vision devices

    Non optical low vision devices

    Video magnifiers/ SeeTV/ Smart vision glasses – one each
14. Binocular Vision

    Accommodative flippers (+/- 1.50 and 2) (1 each)

    Prism Bars (1)

    Stereo-acuity test chart (1)

    Modified Thorington (1)

    Vergence Flippers (12 BO/3 BI) (2)

    Near Worth Four dot test
15. Dispensing

    Geneva Lens measure (6)

    Axis, PAL' marking and Grid charts (1 each)

    PD ruler (10)

    Pen torch-(10)

    Uncut and cut lenses

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Frame adjustment kit (1)

Pupillometer- (2)

- Students are expected to possess one streak retinoscope and Direct Ophthalmoscope on their own
- Institutions are expected to buy original versions of the test charts and maintain calibration of all the equipment periodically

Desirable Batch size for B.Optom:

It should be proportional to the OPD (Outpatient Department) of the clinic/hospital. Each student should be able to examine minimum of 5 patients per day. For example: For an OPD of 150, one can have an intake of 30 students per batch. A clinic/hospital having an OPD of 500 can have the intake of 100 students per batch. If the intake is more than 30, infrastructure should also be increased proportionally. Student and faculty ratio is 10:1. The maximum batch size should be proportional to infrastructure, number of faculties and OPD.

Desirable Batch size for M.Optom:

- Maximum of 25% of Bachelor's program shall be the batch size of a post graduate program.
- Teachers at the level of Assistant Professor II or Scientist D and above shall guide the students
- The teacher student ratio for dissertation guidance shall be 1:4.

Guidelines for standalone institutes:

- A clear legal vetted (Notarised stamp paper) Memorandum of understanding (MoU) needs to be provided for any institute/hospital for sharing the infrastructure and it should follow the NCAHP guidelines.

Faculty requirement for UG:

- Full time (FT); Part time (PT)
- It is recommended that a core faculty and student ratio for UG 1:10 to be followed.
- Faculty (Optometrists) ratio shall be approximately 1:2:5 for Professor: Associate Professor: Assistant Professor.
- Ideally all the faculties should be full time. In case of non-availability of full time faculty, 40% may be part time/visiting/Ad hoc faculties (non-core subjects only)
- Faculties appointed for academics for teaching purposes are considered as Full time (Maximum of 8 hours per day or Minimum 40 hours per week).
- If the college/hospital wants faculties to take care of OPD for 3 days in a week, then faculty requirement shall be doubled.
- Visiting faculties can also be considered as part time.

Suggested faculty strength for UG:

30 seats (5*30=150 students)	**40 seats**	**50 seats**	**60 seats**	**100 Seats**
	(5*40=200 students)	**(5*50= 250 students)**	**(5*60= 300 students)**	**(5*100= 500 students)**
Professor – 1	Professor – 1	Professor –1	Professor – 2	Professor – 4
Assoc. Prof. - 2	Assoc. Prof. - 3	Assoc. Prof. - 1	Assoc. Prof. – 4	Assoc. Prof. – 8
Asst. Prof. – 12	Asst. Prof. – 16	Asst. Prof. – 20	Asst. Prof. – 24	Asst. Prof. – 38

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Library Details:

Item	Requirement
Text Books As per syllabus; one copy of Book per 10 students.	Approximately 450 books for 30 intake and 900 books for 60 in take for UG.
Reference books	100 Advanced Books As per requirement
Journals	At least 2 international and 2 nation al journals
Subscription to electronic data base / e-journals	Required
Mandatory Internet facility Access to e-library Equipment	Minimum 15 computer terminals for 60 students/8 for 30 students.

Faculty requirement for PG:

- Principal/Vice principal/HOD is same for both UG and PG programs.
- It is recommended that a core faculty and student ratio of 1:3 for PG to be followed.
- Minimum of 5 optometry speciality clinics (headed by Optometrists only) need to be seen by a PG student in EACH speciality clinic.
- Student faculty ratio needs to be 3:1 at least Associate professor Level for PG teaching. In case of non-availability of full time faculty, 30% may be part time/visiting/Ad hoc faculties.
- Separate facilities need to be provided for PG students/Fellowship programs/PhD programs.

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