Sri Guru Ram Das University of Health Sciences, Amritsar
Course Structure for the Bachelors in Optometry (Code-BOM.2.6) session 2024

Course code	Course Title	Course Type	L+T+P	Total Credits/Week	Weightage Theory/ Practical
Semester-I					
BOM-ANT.201	Anatomy-I	Foundation	3+0+2	5	25+25=50T 50P
BOM-PHY.201	Physiology-I	Foundation	3+0+2	5	25+25=50T 50P
BOM.201	Public Health Optometry	Core	3+0+2	5	25+25=50T 50P
BOM.202	Ocular Microbiology	Core	3+0+1	4	25+25=50T 50P
BOM.203	Ocular Pathology	Core	3+0+1	4	25+25=50T 50P
ECO.250	English/ Communication skills	Elective	2+0+0	2	NC
		Total Credits	**17+0+8**	**25**	**500**
Semester-II					
BOM-ANT.202	Anatomy-II	Foundation	3+0+0	3	25+25=50
BOM-PHY.202	Physiology-II	Foundation	3+0+0	3	25+25=50
BOM.204	Ocular Anatomy	Core	3+0+1	4	25+25=50T 25P
BOM.205	Ocular Physiology	Core	3+0+1	4	25+25=50 25P
BOM.206	Physical and Physiological Optics	Core	3+0+2	5	50+50=100T 50P
COM.250	Computer applications	Elective	2+0+0	2	NC
		Total Credits	**17+0+4**	**21**	**400**
Semester-III					
BOM.301	Ocular diseases	Core	3+0+2	5	50+50=100T 50P
BOM-PHA.301	Pharmacology	Foundation	3+0+2	5	50+50=100T 50P
BOM.302	Refraction	Core	3+1+2	6	50+50=100T 50P
HVE.350	Human Values & Ethics	Value added course	3+0+0	3	NC
		Total Credits	**12+1+6**	**19**	**450**
Semester-IV (new)					
BOM.303	Optometric Instruments	Core	2+0+1	3	20+50=70T 10+20=30P
BOM.304	Clinical examination of visual system	Core	1+0+2	3	20+50=70T 10+20=30P
BOM.305	Visual perception and psychophysics	Core	2+0+1	3	20+50=70T 10+20=30P
BOM.306	Visual Optics	Core	2+0+1	3	20+50=70T 10+20=30P
BOM.307	Behavioral Health Psychology[#]	Elective	1+0+0	1	NC
BOM.308	Introduction to Quality & Patient safety	Elective	1+0+0	1	NC
BOM.309	Clinical Optometry-I	Core	0+0+4	4	30+70=100P
		Total Credits	**9+0+9**	**18**	**500**
Semester-V					

BOM.401	Systemic Disease	Core	2+0+0	2	30+70=100T
BOM.402	Dispensing Optics	Core	3+0+1	4	20+50=70T 10+20=30P
BOM.403	Geriatric Optometry	Core	3+0+.5	3.5	20+50=70T 10+20=30P
BOM.404	Paediatric Optometry	Core	3+0+.5	3.5	20+50=70T 10+20=30P
BOM.405	Diagnostics and therapeutics of Anterior Segment diseases	Core	4+0+.5	4.5	20+50=70T 10+20=30P
BOM.406	Innovation and technology[#]	Elective	1+0+.5	1.5	20+50=70T 10+20=30P
BOM.407	Clinical Optometry-II	Core	2+0+2	4	20+50=70T 10+20=30P
		Total Credits	**18+0+5**	**23**	**700**
Semester-VI					
BOM.408	Community Ophthalmology, Eye Bank	Core	3+1+4	8	100 100
BOM.409	Investigations in Clinical Ophthalmology	Core	3+1+4	8	100 100
RMB.401	Research Methodology & Biostatistics	Elective	3+0+0	3	100
		Total Credits	**9+2+8**	**19**	**200/200=400**
Semester-VII (Internship six month) minimum 900 hours (calculated based on 6 hours per day for six month of internship)					
		Grand Total	**68+11+50**	**129**	**2700**

Name of the Course	**Public Health Optometry**
Course Code	BOM**.201**
Credit hours	**03**
Teaching Objective	
Learning Outcomes	

Unit No.	Content	Lectures
1.	Concepts and implementation, Stages of diseases; Dimensions, determinants and indicators of health; Levels of disease prevention and levels of health care patterns	**5**
2.	Epidemiology of blindness – Defining blindness and visual impairment; Eye in primary health care; Contrasting between Clinical and community health programs	10
3.	Community Eye Care Programs; Community based rehabilitation programs; Nutritional Blindness with reference to Vitamin A deficiency	7
4.	Vision 2020: The Right to Sight; Screening for eye diseases; National and International health agencies, NPCB; Role of an optometrist in Public Health	7
5.	Organization and Management of Eye Care Programs – Service Delivery models; Health manpower and planning & Health Economics; Evaluation and assessment of health programmes.	8
6.	Optometrists' role in school eye health programmes; Basics of Tele Optometry and its application in Public Health; Information, Education and Communication for Eye Care programs	8
	Total	**45**

Fourth Semester

1. 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

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

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

2. CLINICAL EXAMINATION OF THE VISUAL SYSTEM

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

CL	CP	L	P
1	2	15	60

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

3. **VISUAL PERCEPTION AND PSYCHOPHYSICS**

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

CL	CP	L	P
2	0.5	30	15

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

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

4. *VISUAL OPTICS II*

CL	CP	L	P
3	1	45	30

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

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.

	CL	CP	L	P
5. **BEHAVIORAL HEALTH PSYCHOLOGY**	1	0	15	0

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

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

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

	CP	L	P
1	0	15	0

6. INTRODUCTION TO QUALITY AND PATIENT SAFETY

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.

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

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.
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.

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

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

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

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

Prerequisites: Core optometry and specialty optometry courses

Unit	Topic	Hours
1	Research & Ideation: Concepts. Understanding design and optics behind ophthalmic instruments	5

2	Prototype development	5
3	Clinical validation	5

PRACTICAL (15 hours)

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

CLINICAL OPTOMETRY V

CL	CP	L	P
2	4	30	120

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

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

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

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

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

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

OPTOMETRY AND MULTIDISCIPLINARY ASPECTS OF HEALTH

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

CL	CP	L	P
4	1	60	15

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

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

PRACTICAL (15 hours)

Visit to Public health centres

CL	CP	L	P
2	0	30	0

RESEARCH METHODOLOGY & BIOSTATISTICS

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

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

CL		CP	L
2		4	30

CLINICAL OPTOMETRY VI

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

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:

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

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
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.

BINOCULAR VISION II

INSTRUCTOR INCHARGE: M Optom

CL	CP	L	P
2	1	30	30

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

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

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

CL	CP	L	P
2	0	30	0

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

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

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

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

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.

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.

COURSE PLAN:

Unit	Topic	Hours
1	Evidence Based Practice on the following Common Clinical Conditions 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)

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

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%

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

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.

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.