SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH
(A Deemed to be University Declared under Section 3 of UGC Act, 1956)
Comprising Sri Devaraj Urs Medical College
[Constituent Unit of Sri Devaraj Urs Educational Trust for Backward Classes (Regd.)]
TAMAKA, KOLAR-563103, KARNATAKA, INDIA
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(With effect from 2018-19 batches)

Curriculum for Masters in Optometry

Dean
Faculty of Allied Health Sciences
Sri Devaraj Urs Academy of
Higher Education & Research
Tamaka, Kolar-563 101

Based on Approval BOM- 42-2016, (Resolution No-XLII-08/16) Dated-22/12/2016

REGULATIONS GOVERNING

MASTER OF OPTOMETRY (M. OPTOM)

(UNDER FACULTY OF ALLIED HEALTH AND BASIC SCIENCES)

SYLLABUS/CURRICULUM 2018 – 19

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH
(A Deemed To be University)

Declared under Section 3of UGC Act, 1956, MHRD GOI No.F.9-36/2006-U.3(A)dt.25th May 2007
POST BOX NO.62, TAMAKA, KOLAR – 563 101. KARNATAKA, INDIA.
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SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH
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No: SDUAHER/KLR/ADMN/ 787 / 2018-19 Date: 19.06.2018

NOTIFICATION

Sub: Regulations and Curriculum for Master of Optometry program.

Ref: 1. Proceedings of the 18th meeting of BOS Allied Health Sciences held on 19.08.2017
2. Proceedings of the 19th meeting of BOS Allied Health Sciences held on 08.04.2018
3. Proceedings of the 31st meeting of Academic Council held on 20.05.2018
3. Proceedings of the 49th meeting of Board of Management held on 19.06.2018

Sri Devaraj Urs Academy of Higher Education and Research was declared as Deemed to be University under Section 3 of UGC Act, 1956, MHRD GOI No.F.9-36/2006-U.3(A), Dated 25th May 2007. In accordance with the resolutions of the Board of Studies of Allied Health Sciences and Academic Council held as above, decided to approve Regulations and Curriculum for the Master of Optometry offered under the Department of Allied Health Sciences.

In exercise of the power conferred on the University under Section 6 of MoA rules as per UGC regulations – 2010, the University is pleased to notify the Regulations and Curriculum for students admitted to Master of Optometry program offered under the department of Allied Health Sciences from the academic year 2018-19.

By Order,

Sd/-
Registrar

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH

VISION

"UNIVERSITY OF EXCELLENCE - KNOWLEDGE FOR POSTERITY"

MISSION

- To be a global center of excellence for Teaching, Training and Research in the field of Higher Education.
- To inculcate scientific temper, research attitude and social accountability amongst faculty and students.
- To promote with value based education for the overall personality development and leadership qualities to serve the humanity.

OBJECTIVES

- To provide need based infrastructure and facilities to students to become responsible professionals with social commitment and accountability.
- To implement effectively innovative programs in teaching learning and evaluation.
- To impart scientific and socio cultural temperament among students to forge National identity and needs.
- To provide instruction and training in basic and advanced branches of learning.
- To provide facilities for research for the advancement and dissemination of knowledge.
- To undertake extra mural studies, consultancy, extension programs and field outreach services for the development of society.
- To collaborate with other Universities, Institutions of excellence and Research Organizations within the country and outside for the purpose of teaching, training and research.
- To undertake need based activities for the betterment of socially and educationally backward society.

REGULATIONS GOVERNING MASTER OF OPTOMETRY

1. **Title of the program**

Master of Optometry

2. **Duration of study**

The duration of the course shall be on full time basis for a period of two years from the commencement of the academic term.

3. **Eligibility for Admission**

Candidates who have passed B.Sc., Ophthalmic Technology / Optometry with 55% marks for general category and 50% for reserved category.

4. **Selection Criteria**

Seat Selection shall be based on the University conducted entrance examination. The merit in the qualifying examination followed interview by the selection committee.

5. **Eligibility certificate**

No candidate shall be admitted for the postgraduate degree course unless the candidate has obtained and produced the eligibility certificate issued by the university. The candidate has to make the application to the university with the following documents along with the prescribed fee.

Pass / Degree certificate issued by the parent University.
Marks card of all The University examinations passed.
Migration certificate.
Certificate of conduct.
Proof of SC/ST or category-I as the case may be.

Candidate should obtain the eligibility certificate before the last date of admission as notified by this University.
A candidate who has been admitted to post-graduate course should register his/her name in The University within a month of admission after paying the registration and tution fee.

6. **Medium of instruction**

English shall be the medium of instruction for the subjects of study as well as for the examination.

7. Course of Study

The course shall be pursued on full time basis.

The training of this postgraduate degree shall be residency pattern with graded responsibilities in the management and treatment of cancer patients entrusted to his/her care. The course is mainly focused on practical aspects of Optometry. Hence majority of the course pattern is dedicated towards all the practical aspects. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, case demonstrations, journal review meetings and clinics. Training should include involvement in laboratory and experimental work, and research studies.

Table – I: Distribution of Teaching Hours, Marks in First semester Master of Optometry

Semester-I													
Sl. No	**Code**	**Main Subjects**	**Teaching hours**			**Examination Marks**							
						Theory			**Practical**				**Grand total**
			Theory No. of hours	**Practical No. of hours**	**Total**	**Theory**	**IA**	**Sub total**	**Practical**	**IA**	**Viva voce**	**Sub total**	
I	A010	Applied Optometry Optics	50	60	110	100	20	120	40	10	30	80	200
II	A020	Epidemiology and Community Ophthalmology	50	-	50	100	20	120	-	-	-	-	120
III	A030	Advanced Ophthalmic Diagnostic procedure and instrumentation-I	50	60	110	100	20	120	40	10	30	80	200
		Grand Total	150	120	**270**	300	60	360	80	20	60	200	**520**

Table – II: Distribution of Teaching Hours, Marks in Second semester Master of Optometry

Semester-II													
Sl. No	Code	Main Subjects	Teaching hours			Examination Marks							
						Theory			Practical				Grand total
			Theory No. of hours	Practical No. of hours	Total	Theory	IA	Sub total	Practical	IA	Viva voce	Sub total	
I	B010	Ocular diseases and Diagnostics	50	-	50	100	30	130	-	-	-	-	130
II	B020	Advanced Contact Lens-I	30	-	30	100	30	130	-	-	-	-	130
III	B030	Pediatric Optometry & Binocular Vision	50	-	50	100	30	130	-	-	-	-	130
IV	B040	Low Vision and Geriatric Optometry	30	-	30	100	30	130	-	-	-	-	130
V	B050	Research methodology & Statistics	30	-	30	50	-	50	-	-	-	-	50
		Grand Total	190	-	190	450	120	570	-	-	-	-	**570**

Table – III: Distribution of Teaching Hours, Marks in Third semester Master of Optometry

Semester-III													
Sl. No	**Code**	**Main Subjects**	**Teaching hours**			**Examination Marks**							
						Theory			**Practical**				**Grand total**
			Theory No. of hours	**Practical No. of hours**	**Total**	**Theory**	**IA**	**Sub total**	**Practical**	**IA**	**Viva voce**	**Sub total**	
I	C010	Advanced contact lens – II	30	-	30	80	20	100	-	-	-	-	100
II	C020	Low vision care and rehabilitation	30	-	30	80	20	100	-	-	-	-	100
III	C030	Vision Therapy	30	-	30	80	20	100	-	-	-	-	100
IV	C040	Research project		15	-	-	-	-	40	10	-	-	50
V	C050	Clinics (General)		15	-	-	-	-	40	10	-	-	50
VI	C060	Clinics (specialty)		15	-	-	-	-	40	10	-	-	50
		Grand Total	90	45	90	240	60	300	120	30	-	-	450

Table – IV: Distribution of Teaching Hours, Marks in FOURTH semester Master of Optometry

Semester-IV													
Sl. No	**Code**	**Main Subjects**	**Teaching hours**			**Examination Marks**							
						Theory			**Practical**				**Grand total**
			Theory No. of hours	**Practical No. of hours**	**Total**	**Theory**	**IA**	**Sub total**	**Practical**	**IA**	**Viva voce**	**Sub total**	
I	D010	Clinics (General)	-	20	30	80	20	100	-	-	-	-	100
II	D020	Clinics (Specialty)	-	20	30	80	20	100	-	-	-	-	100
III		Research project / Dissertation	-		30	80	20	100	-	-	-	-	100
		Grand Total	190	30	90	480	120	600	-	-	-	-	600

ATTENDANCE

Every candidate should have attended at least 75% of the total number of classes conducted in a semester from the date of commencement of the semester to the last working day as notified by university in each of the subjects prescribed for that year, separately, in theory and practical. Only such candidates are eligible to appear for the University examinations in their first attempt.

A candidate lacking the prescribed percentage of attendance in any subject either in Theory or Practical in the first appearance will not be eligible to appear for the University Examination in that particular subject. The course shall be pursued on full time basis.

Note: No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.

MONITORING PROGRESS OF STUDIES

WORK DIARY/RECORD BOOK

Every candidate shall attend symposia, seminars, conferences, journal review meetings & lectures during each semester as prescribed by the department and not absent him/her from work without valid reasons. Every candidate shall maintain a work diary and record of his/her participation in the training Program. Special mention may be made of the presentations by the candidate as well as details of laboratory work conducted by the candidate. The work diary and record shall be scrutinized and certified by the concerned faculty members.

INTERNAL ASSESSMENT (IA)

Institutions running the course shall conduct two tests each in every semester for Internal Assessment as per the University prescribed calendar of events. The marks obtained in these tests will be considered for internal assessment. Average of the two marks will be computed for internal assessment and shall be sent to The University as per the notification issued by Registrar before each University examination.

Records and marks obtained in tests will be maintained by the college and made available to The University. Marks of periodic tests shall be displayed on the notice board by the principals without fail.

Note: If a candidate is absent for the test due to genuine and satisfactory reason, such a candidate may be given a re-test within a fortnight.

The distribution of marks for internal assessment for subjects of study in first year and second year are shown in Tables III and IV respectively.

NOTE: A student must secure at least 50% of total marks fixed for internal assessment for a particular subject in order to be eligible to appear in university examination in that subject.

The internal assessment marks **will not be added** to the marks obtained in the university examination for declaration of pass.

10. Schedule of Examination:

10.1 The university conducts two semester end examinations in each year at an interval of not less than four to six months. There are total four semesters in the program.

10.2 A candidate shall not be admitted to the practical examinations for the first time unless he/she produces the class record book certified by the Head of the Department.

10.3 A failed candidate needs to appear for both theory and practical examination in the failed subject/s only in the subsequent examination.

11. Scheme of Examination:

There shall be two university examinations, one at the end of the first year and the other at the end of second year, respectively.

A candidate shall be eligible to appear for the first year M.Sc., Optometry examination at the end of one year from the commencement of the course. He/She should have satisfactorily completed the prescribed course and fulfilled the prescribed attendance.

Written Examination: Shall consist of theory papers each of three hours duration. Each paper shall carry 100 marks (80 theory and 20 Internal assessment).

Practical Examination: There shall be one practical examination at the end of each semester each of the designated subject. Each examination carries 70 marks (60 experiments and 10 internal assessment).

The duration of practical is three hours. Records to be assessed by the external examiners during university practical examination.

Viva Voce: This shall aim at assessing: depth of knowledge, logical reasoning, confidence and oral communication skills. Each viva carries 25 marks. Presentation of dissertation and discussion on it shall be done during viva voce. However, no marks shall be awarded to the presentation of dissertation.Both internal and external examiners shall conduct the practical and viva-voce examination.

The particulars of subjects for examination and distribution of marks are shown in the table.

14. CRITERIA FOR PASS.

Pass criteria in a subject

For declaration of pass in any subject in the University examination the candidates shall pass both in theory and practical examinations components separately as stipulated below;

Theory 50%, which includes marks obtained in written examination, internal assessment and viva voce.

Practical 50% which includes marks obtained in practical examination, practical Internal assessment.

A candidate has to pass in theory and practical separately to pass in a subject in the University examination.
A failed candidate is required to appear for both theory and practical in the subsequent examination in that subject

15. CARRY OVER

A Candidate who has admitted to postgraduate programs under the faculty of Allied health and basic sciences shall be permitted to carry over the backlog subject till the completion of duration of the programme.

However she/ he shall be declared passed in the programme only after successfully passing all the subject/ courses of all semesters of the post graduate programme

16 DECLARATION OF DISTINCTION:

A candidate securing aggregate marks of 75% or more in the first attempt shall be declared as passed with distinction. Distinction will not be awarded for candidates passing the examination with more than one attempt.

17. MAXIMUM DURATION FOR COMPLETION OF COURSE

The maximum duration of the programme shall be four years from the date of admission

The candidate failing to complete the course within four years from the date of admission will be declared unfit to continue and will be discharged from the programme.

18. ELIGIBILITY FOR AWARD OF DEGREE

A candidate shall have passed in all the subjects of first year (1st and 2nd semester) and second year (3rd and 4th semesters) to be eligible for award of degree.

19. Field training

Before final year examination, every student will be posted, as observer, in leading cancer hospitals across the country, for a period of 3 weeks. Successful completion of this field training is a pre-requisite to appear in the final year examination.

SYLLABUS

First year semester-I Master of Optometry

PAPER- I APPLIED OPTOMETRY OPTICS

1. **Nature of light**
2. **Physical optics**: a. Wave optics – Interference, Diffraction, Polarisation
   b. Quantum optics – Scattering, Fluorescence, Laser
   c. Photometry
3. **Geometric optics**
   a. Rectilinear propagation, Reflection, Refraction, Vergence
   b. Lenses: i. Spherical, Cylindrical and toric surfaces
      ii. Telescopes – History, principles, design and uses
      iii. Aspheric surfaces and lenses
   c. The eye as an optical system
   d. Aberrations: a. Lower order aberrations (Myopia, Hypermetropia, Astigmatism)
      b. Higher order aberrations (Spherical, Coma, Trefoil etc)
4. **Spectacles**
   a) Frames
   b) Lenses: Types, Manufacturing, Workshop Practice
      - Prescription laboratory in action.
      - Instruments for making lenses
      - Outline of lens surfacing and polishing
      - Recording and ordering of Ophthalmic lenses
      - Terminology used in Lens workshops
      - Ophthalmic raw material – history and general outline.
      - Manufacturing of Ophthalmic blanks – Glass

- Glass lenses – material types and characteristics
- Glass working –spherical surfaces
- Glass working – Toric and Aspeherical
- ISI Standards for lenses
- Ophthalmic lens designs – best form lenses
- Design of high powered lenses

c) Optical centration & Decentration

d) Glazing

e) Verification of spectacles

Reference Books:

1. Geometrical, Physical and Visual Optics – Micheale Keating Butterworth Heinemann.

2. A Textbook of Optics N.SUBRAMANYAM & BRIJLAL

3. Fundamental of Optics : F.A. JENKINS & H.E. WHITE

PAPER- II EPIDEMIOLOGY AND COMMUNITY OPHTHALMOLOGY

1. **Public Health Optometry**
   - Concepts and implementation
   - Dimensions, determinants and indicators of health
   - Levels of disease prevention and levels of health care patterns
2. **Epidemiology of blindness**
   - Defining blindness and visual impairment
   - Eye in primary health care
   - Contrasting between Clinical and community health programs
3. **Community Eye Care Programs**
   - Community based rehabilitation programs
   - Nutritional Blindness with reference to Vitamin A Deficiency Vision 2020: The Right to Sight
4. **Screening for eye diseases**
   - National and International health agencies, NPCB
   - Role of an optometrist in Public Health
   - Organization and Management of Eye Care Programs – Service Delivery models
   - Health manpower and planning & Health Economics
5. **Evaluation and assessment of health programmes**
   - 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

Reference Books:

1. GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi,
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
4. MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002
5. Epidemiology of eye diseases: Johnson and Gordon

PAPER- III ADVANCED OPHTHALMIC DIAGNOSTIC PROCEDURE & INSTRUMENTATION –I

INVESTIGATIONS

1. Visual Acuity Testing
2. Colour Vision Testing
3. Electroretinography (E.R.G.)
4. Electro-oculography (E.O.G)
5. Electromyography (E.M.G)
6. Electronystagmography (E.N.G)
7. Fluorescein Angiography F.A.
8. Ultrasonography U.S.G
9. Tonometery
10. Visual Field Charting & Perimetry
11. Adaptation & Adaptometry
12. Cryo Technique
13. Diathermy
14. Photo-coagulation
15. Slit lamp examination
16. Goinoscopy
17. pH Testing & Schirmer's Test
18. Fluorescein Staining
19. Syringing & Lacrimal Function Tests

INSTRUMENTS/ EQUIPMENTS

a. Refraction set
b. Colour vision testing devices
c. Lensometer
d. Pupilometer
e. Video acuity test
f. Potential Acuity Meter
g. Exopthalmometer
h. Orthoptic instruments used in the assessment and management of BSV disorders

ANTERIOR SEGMENT

a. Slit Lamp Biomicroscope
b. External photography of the eye
c. Corneal examination: a) Placidos Disc
   b) Keratometer
   c) Specular Microscope
d. Glaucoma: Tonometers, Gonioscope, Humphrey's visual field analyser

POSTERIOR SEGMENT

1. Direct Ophthalmoscope
2. Indirect Ophthalmoscope
3. OCT
4. HRT
5. Ophthalmic Ultrasound
6. Fundus photography by conventional and infrared imaging systems
7. Fundus cameras
8. GDR Unit

Reference Books:

1. Optometric Instrumentation: David Hensen

2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal
3. James Wolffsohn : Eye Essentials Ophthalmic Imaging ,
4. Mark Brezinski,: Optical Coherence Tomography: Principles and Applications
5. Benjamin F.Boyd : Wavefront analysis aberrometers and corneal topography
6. Arun D.singh :Ophthalmologic Ultrasound, An Issue of Ultrasound Clinics,vol 3

Master of Optometry
SYLLABUS
First year semester-II

Paper- I ocular diseases and diagnostics

(Ocular Diseases And Diagnostics-I & II)

Ocular diseases and diagnostics-I

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

SYLLABUS

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

Ocular Diseases And Diagnostics-II

COURSE COMPETENCIES:

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

SYLLABUS (30 hours)

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

REFERENCES:

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

PAPER- II Advanced Contact Lenses – I

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

COURSE COMPETENCIES:

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

SYLLABUS: (30 hours)

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

TEXT/ REFERENCE BOOKS:

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

PAPER-III Pediatric Optometry And Binocular Vision

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

COURSE COMPETENCIES:

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

SYLLABUS: (Total: 50 hours)

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

- Sensorimotor Adaptation and Development of the Horopter
- Two stages in the development of Binocular Vision and Eye Alignment

5. Retinal and cortical Development
6. Abnormal Visual Development
7. What next in Infant Research
8. Clinical Applications:
    - Assessment of Child Vision and Refractive Error
    - Refractive Routines in the Examination of Children
    - Cycloplegic Refraction
    - Color Vision Assessment in Children
    - Dispensing for the Child patient
    - Pediatric Contact Lens Practice
    - Dyslexia and Optometry Management
    - Electrodiagnostic Needs of Multiple Handicapped Children
    - Management Guidelines – Ametropia, Contant Strabismus
    - Management Guidelines – Amblyopia
    - Accommodation and Vergence anomalies
    - Nystagmus
    - Common genetic problems in Paediatric optometry
    - Pediatric Ocular Diseases
    - Ocular Trauma in Children
    - Myopia control
    - Clinical uses of prism

TEXT/ REFERENCE BOOKS:

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

PAPER-IV Low Vision Care And Geriatric Optometry

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

COURSE COMPETENCIES:

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

SYLLABUS (Total: 30 hours)

1. Visual Disorders – Medical Perspective
    - The Epidemiology of Vision Impairment
    - Vision Impairment in the pediatric population
    - Ocular Diseases :
    - Age – Related Cataract,
    - Glaucoma
    - ARMD
    - Diabetic retinopathy
    - Corneal Disorders
    - Ocular Trauma
    - Sensory Neuro-ophthalmology and Vision Impairment
    - Refractive Disorders
2. Visual Disorders – The Functional Perspective
    - Low Vision and Psychophysics
    - Visual Functioning in Pediatric Populations with Low Vision
    - Perceptual correlates of Optical Disorders
    - Functional aspects of Neural Visual Disorders of the eye and Brain
    - Visual Disorders and Performance of specific Tasks requiring vision

3. Visual Disorders – The Psychosocial Perspective
- Developmental perspectives – Youth
- Vision Impairment and Cognition
- Spatial orientation and Mobility of people with vision impairments
- Social skills Issues in vision impairment
- Communication and language: Issues and concerns
- Developmental perspectives on Aging and vision loss
- Vision and cognitive Functioning in old age

4. Interactions of Vision Impairment with other Disabilities and sensory Impairments.
- Children with Multiple Impairments
- Dual Vision and Hearing Impairment
- Diabetes Mellitus and Vision Impairment
- Vision Problems associated with Multiple Sclerosis
- Vision Impairment related to Acquired Brain Injury
- Vision and Dementia
- Low Vision and HIV infection

5. The Environment and Vision Impairment: Towards Universal Design
- Indian Disabilities act
- Children's Environments
- Environments of Older people
- Outdoor environments
- Lighting to enhance visual capabilities
- Signage and way finding

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

PAPER-V Research Methodology & Statistics

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

COURSE OUTCOMES:

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

COURSE PLAN: (Total: 30 hours)

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

TEXT /REFERENCE BOOKS:

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

M.Sc. Optometry
SYLLABUS
Second year semester-III

PAPER- I Advanced Contact Lens-II

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

COURSE COMPETENCIES:

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

TEXT/ REFERENCE BOOKS:

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

COURSE PLAN: (Total: 30 hours)

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

PAPER-II **Low Vision Care And Rehabilitation**

INSTRUCTOR IN CHARGE: M.Optom/PhD

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

COURSE COMPETENCIES:

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

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

COURSE PLAN: (Total – 30 hours)

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

PAPER-III Vision Therapy

INSTRUCTOR IN CHARGE:FCOVD/M.Optom
COURSE OBJECTIVES: The course is designed to help expand the student's knowledge base in all aspects of behavioural vision care. Advanced competency is expected in the following principles and procedures for each clinical condition.
Principles and Procedures – The student should be able to define and explain:
1. The unique qualities, scientific, and clinical principles of each clinical condition.
2. The epidemiological and demographic characteristics of each clinical condition.
3. The characteristic history, signs and symptoms for each clinical condition.
4. How to assess each clinical condition, including specific test protocols and their interpretation.
5. The differential diagnosis for each clinical condition.
6. The specific treatment and management of each clinical condition including:
6.1 Prognostic indicators
6.2 Treatment options
6.3 Duration and frequency of treatment
6.4 Treatment philosophy and goals
6.5 Specific lens treatment and therapy procedures including rationale for treatment
6.6 Ergonomics and visual hygiene
6.7 Outcomes to determine successful completion of treatment
6.8 Frequency of follow-up care and patient instructions
6.9 Referral criteria (medical, neurological, educational, etc.)

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

COURSE PLAN: (Total - 30 hours)
1. Clinical Conditions
1.1 Strabismus and Amblyopia
1.1.1 Amblyopia
Anisometropic / Isometropic Refractive Amblyopia
Strabismic Amblyopia
Hysterical Amblyopia
Form Deprivation Amblyopia
Differential diagnoses in childhood visual acuity loss
1.1.2 Strabismus
Esotropia-
Infantile
Accommodative
Acquired
Microtropia
Sensory
Convergence Excess

Divergence Insufficiency

Non-accommodative

Sensory Adaptations

Exotropia

Divergence Excess

Convergence Insufficiency

Basic Exotropia

Congenital

Sensory

Vertical Deviations

Noncomitant Deviations (AV Syndrome; Duane's Retraction Syndrome; Brown's Syndrome; III, IV, VI nerve palsy, etc.)

Differential diagnoses in strabismus

Special clinical considerations

Anomalous Correspondence

Eccentric Fixation

Suppression

Motor Ranges

Stereopsis

Horror fusionalis/intractable diplopia

1.2 Perception and Information Processing

1.2.1 Neurological / Psychological

Ambient / focal systems.

Visual perceptual midline

Parvo cellular / Magno cellular function

Perceptual Style (central, peripheral)

Impact of colored filters

Attention

1.2.2 Intersensory and Sensorimotor Integration

Visual-auditory

Visual-vestibular

Visual-oral

Visual-motor

Visual-tactual

1.2.3 Performance indicators

Laterality and directionality

Visual requirements for academic success

Bilaterality

Gross and fine motor ability

Form perception/visual analysis

Spatial awareness

Visualization

Visual memory

Visual sequential memory

Form constancy

Visual speed and visual span

Visual sequencing

1.3 Refractive conditions and visual skills

1.3.1 Refractive Conditions

Developmental influence on refraction &emmetropization

Aniseikonia

Myopia

Astigmatism

Hyperopia

1.3.2 Ocular Motor Function

Eye movements and reading

Pursuit dysfunctions

Nystagmus

Saccadic Dysfunctions

1.3.3 Accommodation

Role in myopia development

Role in computer-related asthenopia

1.3.4 Fusion in Non-Strabismic Conditions

Fixation disparity

Motor fusion

Sensory fusion

1.4 Special clinical conditions

1.4.1 Acquired brain injury (traumatic brain injury {TBI} and stroke)

1.4.2 Developmental disabilities (Down Syndrome, Developmental delay, etc.)

1.4.3 Visually induced balance disorders

1.4.4 Motor disabilities (Cerebral Palsy, ataxia, etc.)

1.4.5 Behavioral disorders

1.4.6 Autism spectrum disorders

1.4.7 ADD / ADHD

1.4.8 Dyslexia and specific reading disabilities

1.4.9 Learning Disabilities

1.4.10 Computer Vision Syndrome

2. Vision Therapy Concepts to Consider

2.1 Peripheral awareness:

2.1.1 focal / ambient roles

2.1.2 Significant findings which are good or poor prognostic indicators of vision therapy and lens application

2.1.3 Development, rehabilitation, prevention, enhancement

2.1.4 Behavioral lens application

2.1.5 Yoked prism rationale for treatment and application

2.1.6 The relationship between the visual and vestibular systems

2.1.7 SILO/SOLI

2.1.8 Visual stress and its impact on the visual system

2.1.9 Role of posture in vision development, comfort and performance

2.1.10 Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool.

2.1.11 Relationship of speech-auditory to vision

2.1.12 How television, reading, video gaming might restrict movement, computer work, nutrition, etc., impact vision?

2.1.13 Perceptual Style, e.g., spatial/temporal, central/peripheral

RESEARCH PROJECT:

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

CLINIC: GENERAL

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

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

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

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

CLINIC: SPECIALITY

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

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

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

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

M.Sc. Optometry
SYLLABUS
Second year semester-IV

CLINIC: GENERAL

GENERAL OPTOMETRY - OCULAR DISEASES AND DIAGNOSTICS - I

COURSE COMPETENCIES:

Ability to perform clinical decision making for Ocular abnormalities

Ability to perform and interpret corneal diagnostics including
Topography/Pentacam/Orbscan

Specular microscopy

Pachymetry

Abberometry
AS OCT UBM

Ability to perform pre and post Lasik evaluation

Ability to interpret glaucoma diagnostic reports
OCT

HRT

GDx

Gonioscopy

ONH evaluation

Ability to perform anterior segment photography and ophthalmic imaging

Ability to manage and co-manage therapeutics for anterior segment

CLINIC: SPECIALITY

OCULAR DISEASES AND DIAGNOSTICS - II
COURSE COMPETENCIES:

Ability to perform electro diagnostic procedures and interpret electro diagnostic reports
ERG

EOG

VEP
Ability to perform stereoscopic fundus photography

Ability to use Ocular photography as 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

LOW VISION CARE
COURSE COMPETENCIES:

Ability to diagnose and manage patients with vision impairment

Ability to perform specialized diagnostics
Rudimentary vision

Berkeley visual field test

Hand disc perimetry
Ability to train for eccentric viewing and steady eye techniques

Ability to rehabilitate patients with VI with vocational counselling and activities of daily living

PEDIATRIC OPTOMETRY AND BINOCULAR VISION:
COURSE COMPETENCIES:

Ability to diagnose and manage and co-manage binocular vision anomalies

Ability to co-manage visual perceptual anomalies

Ability to manage diplopia, suppression and ARC

Ability to manage amblyopia

ADVANCED CONTACT LENSES – I
COURSE COMPETENCIES:

Ability to understand corneal physiology and oxygen needs

Ability to diagnose and manage complications due to contact lenses

Ability to fit specialized contact lenses
Keratoconus

Rose'Klenses

Mini scleral lenses

ADVANCED CONTACT LENSES – II
COURSE COMPETENCIES:

Ability to fit specialized contact lenses
Keratoconus

Rose'Klenses

Mini scleral lenses

Hybrid lenses

Orthokeratology

Scleral lenses: Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia
Ability to fit custom made ocular prosthesis

Ability to fit pediatric contact lenses

VISION THERAPY
COURSE COMPETENCIES:

Principles and Procedures – The student should be able to define and explain:
The unique qualities, scientific, and clinical principles of each clinical condition.

The epidemiological and demographic characteristics of each clinical condition.

The characteristic history, signs and symptoms for each clinical condition.

How to assess each clinical condition, including specific test protocols and their interpretation.

The differential diagnosis for each clinical condition.

The specific treatment and management of each clinical condition including:
Prognostic indicators

Treatment options

Duration and frequency of treatment

Treatment philosophy and goals

Specific lens treatment and therapy procedures including rationale for treatment

Ergonomics and visual hygiene

Outcomes to determine successful completion of treatment

Frequency of follow-up care and patient instructions

Referral criteria (medical, neurological, educational, etc.)

SKILLS BASED OUTCOMES AND MONITORABLE INDICATORS FOR OPTOMETRIST

PATIENT HISTORY

Communicates with the patient

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

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

Makes general observations of patient

Obtains the case history

Obtains and interprets patient information from other professionals

PATIENT EXAMINATION

Formulates

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

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

Implements examination plan

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

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

Assesses the ocular adnexae and the eye

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

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

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

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

The nature of the disease state is determined.

Microbiological tests are selected and ordered

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

Vision and visual acuity are measured.

Visual fields are measured.

Colour vision is assessed.

Pupil function is assessed.

Assesses refractive status

Assesses oculomotor and binocular function.

Eye alignment and the state of fixation are assessed.

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

The status of sensory fusion is determined.

The adaptability of the vergence system is determined.

Placement and adaptability of accommodation are assessed.

Assesses visual information processing

Visual perceptual abilities are assessed.

Visual-motor integration is assessed.

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

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

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

DIAGNOSIS

Interprets and analyses findings to establish a diagnosis or diagnoses.

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

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

PATIENT MANAGEMENT

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

The diagnosis is presented and explained to the patient.

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

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

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

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

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

Prescribes spectacles

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

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

Prescribes contact lenses

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

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

Therapeutic and cosmetic contact lenses are recommended and prescribed.

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

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

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

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

Prescribes low vision devices.

A range of low vision devices is demonstrated.

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

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

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

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

Prescribes pharmacological treatment regimens

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

Microbiological factors are considered in the choice of therapeutic agent(s)

Pharmacological factors are considered in the choice of therapeutic agent(s)

Systemic factors are considered in the choice of therapeutic agent(s)

Ocular factors are considered in the choice of therapeutic agent(s)

Available delivery systems are considered in the choice of therapeutic agent(s)

Drug substitution factors are considered in the choice of therapeutic agent(s)
Prescribes therapeutic drugs.

Monitors and modifies treatment regimen.

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

Patients are instructed about precautionary procedures and non-therapeutic management.
Dispenses optical prescriptions accurately.
The prescription is interpreted and responsibility for dispensing is accepted.

The patient is assisted in selecting an appliance.

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

The appliance is verified against the prescription prior to delivery.

The appliance is adjusted and delivered and the patient is instructed in the proper use and maintenance of the appliance and of any adaptation effects which may be expected.
Manages patients requiring vision therapy.
Treats patients diagnosed with accommodative, vergence, strabismic and amblyopic conditions.

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

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

Progress of the vision therapy program is monitored.
Treats ocular disease and injury.
Non-pharmacological treatment or intervention procedures are performed.

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

The patient is instructed in the use, administration, storage and disposal of pharmaceutical agents.
The effect of treatment is monitored and changes in management are recommended.
Refers the patient.
The need for referral to other professionals for assessment and/or treatment is recognised and discussed with the patient.

A suitable professional is recommended to the patient.

Timely referral, with supporting documentation, is made to other professionals.

Patients can be jointly managed with other health care practitioners.
Co-operates with ophthalmologist in the provision of pre- and post-operative management of patients.
Provides pre-operative assessment and advice.

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

Provides emergency management for observed post-surgical complication.

Arranges appropriate referral for further post-operative treatment or assessment of complications.
Provides advice on vision in the workplace.
Visual screenings for occupational or other purposes are provided.

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

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

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

RECORDING OF CLINICAL DATA

Ensures that data is organised in a legible, secure, accessible, permanent and unambiguous manner.
All relevant information pertaining to the patient is recorded in a format which is understandable and useable by the optometrist and his/her colleagues.

Patient records are kept in a readily retrievable format and are physically secure.
Maintains confidentiality of patient records.
Understands the need to ensure that access to records is limited to authorised personnel.

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

Distribution of Type, Number and marks of Questions for Various Subjects

THEORY

Subjects having maximum marks = 100			Total
Type of question	Number of questions	Marks for Each question	
Essay type	10 (no choice)	10	100

-End-