Rajiv Gandhi University of Health Sciences, Karnataka

4th "T" Block, Jayanagar, Bangalore – 560041

Revised Ordinance Governing Regulations And the Curriculum of **Master Of Optometry Course– 2022-23**

RGUHS

The Emblem

The Emblem of the Rajiv Gandhi University of Health Sciences is a symbolic expression of the confluence of both Eastern and Western Health Sciences. A central wand with entwined snakes symbolises Greek and Roman Gods of Health called Hermis and Mercury is adapted as symbol of modern medical science. The pot above depicts Amrutha Kalasham of Dhanvanthri the father of all Health Sciences. The wings above it depicts Human Soul called Hamsa (Swan) in Indian philosophy. The rising Sun at the top symbolises knowledge and enlightenment. The two twigs of leaves in western philosophy symbolises Olive branches, which is an expression of Peace, Love and Harmony. In Hindu Philosophy it depicts the Vanaspathi (also called as Oushadi) held in the hands of Dhanvanthri, which are the source of all Medicines. The lamp at the bottom depicts human energy (kundalini). The script "Devahitham Yadayahu" inside the lamp is taken from Upanishath Shanth i Manthram (Bhadram Karnebh i Shrunuyanadev...), which says "May we live the full span of our lives allotted by God in perfect health" which is the motto of the Rajiv Gandhi University of Health Sciences.

ORDINANCE GOVERNING REGULATIONS AND CURRICULUM OF Master Of Optometry COURSE -2022

SECTION I

REGULATIONS GOVERNING Master Of Optometry COURSE

1. **Title of the course**
   Master Of Optometry

2. **Duration of the Course**
   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**
   a. A pass in B.Sc OPTOMETRY course from institutions affiliated to RGUHS, or from other universities considered equivalent by RGUHS..
   b. Candidates passing B.Sc OPTOMETRY through correspondence course shall not be eligible.

4. **Selection Criteria**
   Selection shall be based on merit in the qualifying examination. The candidate has to choose the branch of his/her choice during the time of seat selection.

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 an application to the university with the following documents along with the prescribed fee.
   Pass / degree certificate issued by the university.
   Marks cards of all the university examinations passed.
   Migration certificate.
   Certificate of conduct.
   Proof of SC/ST or category- I as the case may be.

   Candidates should obtain the eligibility certificate before the last date for admission as notified by the 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 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. However, both study and examination for main and subsidiary subjects in first year . In the second year the student shall study subject of his/her chosen branch. Students shall be

posted to RGUHS approved hospitals or clinical laboratories during the practical hours.

Subjects for study and teaching hours for first year and second year **Master Of Optometry** course are shown in Table- I and Table – II respectively.

TABLE- I DISTRIBUTION OF TEACHING HOURS IN FIRST YEAR Master Of Optometry SUBJECTS

Sl. no	Main subjects	Theory No.of Hours	Practical No. of Hours	Total
1	**Basic Sciences**			220
	a. Ocular Anatomy	25	60	
	b. Ocular Physiology	25	60	
	c. Ocular Pharmacology	25	-	
	d. Pathology and Microbiology	25	-	
2	**Applied Optics**			360
	a. Visual Optics	80	100	
	b. Dispensing Optics	80	100	
3	**Clinical Optometry**			450
	a. Ocular Diagnostic instrumentation	150	100	
	b. Ocular diseases and systemic	100	100	
4	**Subsidiary subjects:**			
	a. Biostatistics	30	10	40
	b. Research methodology	20	-	20
	c. Occupational optometry & Public Health	90	-	90
	TOTAL	510	530	1090

TABLE- II DISTRIBUTION OF TEACHING HOURS IN SECOND YEAR Master Of Optometry SUBJECTS FOR THE BRANCHES

Sl. No.	Main Subjects	Theory No. of Hours	Practical No.of Hours	Total
1	Advanced contact lens	150	700	850
2	Low Vision and Rehabilitation	150	700	850
3	Advance binocular vision & Pediatric Optometry	150	700	850

8. Attendance

Every candidate should have attended at least 80% of the total number of classes conducted in an academic year from the date of commencement of the term to the last working day as notified by the 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 at 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 eligibleto appear for the university examination in that particular subject.

The course shall be pursued on a **full-time** basis. No candidate shall be permitted to work in a nursing home or laboratory outside the institution while studying the course. No candidate shall attend 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.

9. Monitoring Progress of Studies

Work Diary/ Record Book- every candidate shall attend symposia, conferences, journal review meetings & lectures during each semester as prescribed by the department and not absent himself/ herself from work without valid reasons. Every candidate should maintain a work diary and record his/her participation in the training programme. (Refer section III for model check lists and record book). Special mention may be made of the presentations by the candidates as well as details of laboratory work conducted by the candidates. The work diary and records shall be scrutinized and certified by theconcerned faculty members.

10. Project

Candidates pursuing **Master Of Optometry** are required to carry out project work on a selected topic under the guidance of a recognized post graduate teacher. The resultsof such a work shall be submitted in the form of a dissertation.

The project report aimed at training in research methods and techniques. It includes identification of problem, formulation of hypothesis, search and review of literature, getting acquainted with recent advances, collection of data, critical analysis, interpretation of results and drawing conclusions. (Refer Section IV for details on Project Work).

11. Schedule of examination

a. The university conducts two examinations in a year at an interval of not less than four to six months.
b. The number of examiners for practical and viva- voce shall be two, comprising of one internal and one external examiner appointed by the university.
c. 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 ofthe Department.
d. A failed candidate needs to appear for both the theory and practical examination in the failed subjects only in the subsequent examination.

12. Scheme of examination

University examination:

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

First year Master Of Optometry:

Eligibility to appearing in university examination:

A candidate shall be eligible to appear for first year **Master Of 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:

The written examination shall consist of three theory papers, each of three hours duration. Each paper shall carry 100 marks

Practical examination:

There shall be one practical examination in each of first year subjects. Each practical examination carries 100 marks.

Viva- voce:

This shall aim at assessing- depth of knowledge, logical reasoning, confidence and oral communication skills. Both internal and external examiners shall conduct the viva- voce. Total marks shall be 50.

The particulars of subjects for examination and distribution of marks are shown in the Table- III

TABLE- III. MAIN SUBJECTS FOR EXAMINATION AND DISTRIBUTION OF MARKS FOR FIRST YEAR

Sl. No.	Main Subjects	Theory		Practical			Grand total
		No. of Papers	Max Marks	Practical Marks	Viva-Voce Marks	Total Practical Marks	
A	Paper I- **Basic Sciences** Section A: Ocular Anatomy physiology Section B: Ocular Pharmacology ,Pathology and Microbiology	One	100	100	50	150	250
	Paper II- **Applied Optics** Section A: Visual Optics Section B: Dispensing Optics	One	100	100	50	150	250
	Paper III- **Clinical Optometry** Section A: Ocular Diagnostic instrumentation Section B: Ocular diseases & systemic diseases	One	100	100	50	150	250
B	****Subsidiary subjects** Section a: Statistics Section b: Research Methodology	One	100 (60) (40)	No practical examination			100
	C. Occupational optometry & Public Health	One	100	No practical examination			100

Second year Master Of Optometry

Examinations in II year shall be held separately. A candidate will appear only if him/her clear the 1st year **Master Of Optometry**

Eligibility: To be eligible to appear in the II year examination a candidate shall have:

i. Completed one year of study in II year, and
ii. Passed in all the subjects of I year.

Written examination:
The written examination shall consist of three theory papers. Each paper shall be of three-hour duration. Each paper shall carry 100 marks.

Practical examination:
There shall be 3 practical examinations for each subject . The marks for each practical examination shall be 100 marks.
The duration of practicals from 9.00 a.m. to 5.00 p.m. with a lunch break of one hour in between for each of the branches is as follows:
Master Of Optometry: 3 days

Viva- voce:
This shall aim at assessing the depth of knowledge, logical reasoning, confidence & oral communication skills. Total marks shall be 50. Presentation of the project work and discussion on it shall be done during the viva- voce, 10 marks will be awarded for the same which will be included along with viva- voce marks.
Be internal and external examiners shall conduct the practical and viva- voce examination.

The particulars of subjects for examination and the distribution of marks are shown in the Table- IV.

TABLE- IV. MAIN SUBJECTS FOR EXAMINATION AND DISTRIBUTION OF MARKS FOR SECOND YEAR

Sl. No.	Main Subjects	Theory			Practical			Grand Total
		No. of Papers	Marks for each paper	Total	Practical Marks	Viva-voce Marks	Total	
1	Advanced contact lens studies	one	100	100	100	50	150	250
2	LowVision and Rehabilitation	one	100	100	100	50	150	250
3	Advanced binocular vision & Pediatric Optometry	one	100	100	100	50	150	250
4	Dissertation	No theory Paper			100	50	150	150

*Records- To be assessed by the external examiners during University Practical examination

13. Criteria for Pass.

a. Criteria for pass in a subject:
For declaration of pass in any subject in the University examination, a candidate shall pass both in Theory and Practical examination components separately, as stipulated below:

Theory component consists of marks obtained in University Written paper. For a pass in a theory subject, a candidate shall secure not less than 50% of maximum marks in each paper and an aggregate of 50% marks per subject prescribed for the University examination separately. For pass in practical examination the candidate has to secure 50% marks in aggregate i.e. marks obtained in the practical and viva- voce examination added together provided the candidate has secured 40% marks in practical examination. A failed candidate is required to appear for both Theory and Practical in the subsequent examination in that subject.

b. Criteria for pass in First and Second year:
To consider as pass in first or second year a candidate has to appear in all the papers prescribed for each subject and has to pass in all the prescribed subjects of the University examination for the concerned year.

14. Carry over:

If a candidate fails in one subject in the first year they can carry over that subject to the second year. Failed candidates shall be permitted to appear in the failed subject in the following university examination along with the second year subjects. However he or she shall clear all failed subjects in the second year tobe awarded the degree.

15. Declaration of Class:

- Students securing more than 75% marks shall be awarded distinction.
- Students securing more than 65% marks and less than 75% marks shall be awarded First class.
- Students securing more than 50% marks but less than 65% marks shall be awarded second class.
- Students securing more than 50% marks but would have taken more than attempt to pass shall be awarded pass class.

16. Number of attempts:

A candidate is permitted not more than three attempts (actual appearance) to pass the first year examination or within two academic years from the year of admission, whichever is earlier. A candidate will not be allowed to continue the course if he/she fails to comply with the above.

17. Maximum duration for completion of course:

A candidate must complete the course within four years from the date ofadmission, failing which the candidate will be discharged.

18. Eligibility for award of degree:

A candidate shall have passed in all the subjects of first and second year to be eligible for award of a degree.

SECTION II

AIM AND OBJECTIVES

Objective of Programme:

a) To impart knowledge and understanding of the basic aspects of the subject to gain professional competence in the arena of optometry
b) To equip the student with the skills and expertise in carrying out all routine and sophisticated optometry procedures efficiently.
c) To instill qualities to be able to work as an optometrist independently

Professional Aim:

By the end of the program, students should be able to:

- Work diligently to deliver quality service collaboratively and independently
- Uphold ethical standards by incorporating principles of safety, accountability, responsibility,
- Identify his/ her professional learning and developmental needs.
- Promote, support and further advance the character, status and interests of an Optometrist
- Promote advancing scientific knowledge.

Scope

The program makes use of modern teaching methods and a combination of the theoretical aspects of the subjects with practical reinforcement endows the students with a superior knowledge and enable them to discover their hidden potential, realize the importance of hard work and hone their intellectual, analytical and managing skills towards a successful and fulfilling career, supplemented and guided by experienced and quality teaching throughout the course of study.

Employ ability

On completion of the **Master Of Optometry**, they can work as an optometrist in aspecialized area.

Acquire adequate skills and competence in performing various tasks as required.

- Adopt ethical principles in all aspects of the professional practice.
- Foster professional honesty and integrity.
- Discharge the duties irrespective of social status, caste, creed or religion of the customer/ client.
- Develop oral and written communication skills.
- Provided leadership and gets the best out of his or her team in a congenialworking atmosphere.
- Apply high moral and ethical standards while carrying out research.
- Be humble and accept the limitations in his or her knowledge and skill and ask for help from colleagues when needed.

SECTION II

COURSE CONTENT
FIRST YEAR Master Of Optometry

Basic Sciences
Ocular Anatomy

SL NO	TOPICS	HOURS
1	Outline of Visual system a) Three coats of Eye ball b) Conjunctiva & Sclera, Cornea and Limbus – Regions, layers, functions, significance c) Uvea – Regions, layers, functions, significance d) Retina - Regions, layers, functions, significance e) Anterior chamber – Structure, depth significance f) Aqueous humor – secretion and drainage aspects g) Crystalline lens - Layers, functions, significance, metabolism – Ageing process	13
2	Blood supply and Cranial nerve supply to eye and adnexa	2
3	Visual pathway – Structure and significance	3
4	Tear film – Layers, function and significance	2
5	Ocular embryology	3
6	Understanding of genetics for Optometric counseling	2
	Total	**25**

Ocular Physiology

SL NO	TOPICS	HOURS
1	Visual acuity – recent advances and assessment , Visual perceptions – optical illusion	5
2	Dark and light adaptation – significance and tests involved – significance of practice	5
3	Color Vision – theories, classifications, defects – methods of measurement	5
4	Visual Fields – a) Definition, significance, methods of examinations-conventional and latest trends b) Defects – types, descriptions, significance on methods of evaluation	5
5	Intra – Ocular –Pressure – Significance, normal features, age variations, methods of measurements – outline and significance.	5
	Total	**25**

Ocular Pharmacology

SL NO	TOPICS	HOURS
1	Classification of Ophthalmic drugs	2
2	Sympathomimetic & Sympatholytic	4
3	Parasympathomimetic & Parasympatholytic	4
4	Diagnostic drugs used in optometry – Dyes and stains	5
5	Antibacterial, Antifungal agents	5
6	Steroids and Non- steroidal anti-inflammatory drugs	5

Pathology and Microbiology

SL NO	TOPICS	HOURS
1	Infections, Inflammations and repair mechanism	4
2	Allergic reactions in Ocular tissue	3
3	Bacteria, Virus, Fungus and their features for differentiations	4
4	Common bacterial infections of the eye	4
5	Common fungal infections of the eye	3
6	Common viral infections of the eye	3

PRACTICALS

120 Hours

- Practical dissection of Bull's eye
- Practical demonstration of orbital structures
- Central Nervous System
  - Sensory system
  - Motor system
  - Cranial system
  - Superficial and deep reflexes
- Visual acuity Assessment
- Visual Fields Assessment
- Intra – Ocular –Pressure Assessment
- Color Vision Assessment

Reference Books:Basic Sciences

Ocular Anatomy

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

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

Ocular Physiology

1. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
2. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

OCULAR PHARMACOLOGY

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004 2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996 3. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

PATHOLOGY

1. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004. 2. S R Lakhani Susan

OCULAR MICROBIOLOGY

1. BURTON G.R.W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.
2. M J Pelczar (Jr),ECS Chan, NR Krieg : Microbiology ,fifth edition, TATA McGRAW-HILL Publisher, New Delhi,1993

SCHEME OF EXAMINATION OF Master Of Optometry I year

I. THEORY EXAMINATION: One paper of 3 hrs duration carrying 100 marks having 2 sections of 50 Marks each

PAPER: - Basic Sciences **Max marks : 100 mks**
Sec A: Ocular Anatomy & physiology Max marks: 50 marks
Sec B: Ocular Pharmacology, Pathology and Microbiology Max marks: 50 marks

QUESTION PAPER MODEL

Sec A: Ocular Anatomy & physiology

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

Sec B: Ocular Pharmacology, Pathology and Microbiology

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

II. PRACTICAL EXAMINATION **Max Marks: 100**

Any one practical under each category with bench viva
I. Qualitative - 30 Marks

II. Techniques - 40 Marks

III. Quantitative - 30 Marks

IV. VIVA-VOCE-50 Marks
Theory topics in syllabus to be covered by internal and external examiners
Grand Total -150 marks

Applied Optics

Visual Optics

SL NO	TOPICS	HOURS
1	Refractive Conditions a) Emmeteropia b) Myopia c) Hypermetropia d) Astigmatism e) Presbyopia f) Anisometropia and Aniseikonia g) Aphakia and Pseudophakia h) Etiology of refractive errors	15
2	Accommodation – definition, mechanism a) Far and Near point of accommodation b) Correction of spherical Ametropia c) Axial versus refractive Ametropia	5
3	Convergence a) Definition, mechanism, measurement b) Types c) Anomalies of convergence – Etiology and management d) Near point of convergence – Significance	5
4	AC/A ratio	2
5	Epidemiology of Ametropia a) Incidence and distribution of refractive errors in general population b) Changes in refraction with age c) Hereditary and environmental factors	3
6	Measurement of refraction – Methodology a) Objective methods of Refraction - Retinoscopy – principles and methods - Retinoscopy- speed of reflex and optimum condition - Retinoscopy- design consideration. Dynamic/ Static - Difficulties in objective tests and their avoidance - Spherical equivalent - Keratometry - Direct Ophthalmoscopy - Auto refractometry - Topography; Topography modeling systems b) Subjective Refraction - Fogging - Duochrome test - Astigmatism refining techniques 1) Jackson's cross cylinder	15

	2) Astigmatic Fan & Clock Dial 3) Rotating 'T' - Friends test - Shoe test - Binocular Balancing - Binocular refraction	
7	Management of Patient with Ametropia a) Guidelines for correction of refractive errors based on - 1) Visual needs of patients 2) Age and status of accommodation 3) Modes of correction – Spectacles , contact lens, refractive surgery • Ocular refraction versus spectacle refraction • Ocular accommodation versus spectacle accommodation • Spectacle magnification and relative spectacle magnification • Retinal image blur, depth of focus and depth of field	**10**
8	Light level at the retina - correlation to retinoscopy Light interaction with the fundus – Correlation to funduscopy Aberrations and Retinal Image Quality - Monochromatic Aberration and Eye - Chromatic aberrations - Higher order aberrations - Retinal Image quality	**10**
9	Measurement and management of patient with refractive error - Objective and Subjective methods of refraction - Pharmacology and refraction - Monocular and Binocular subjective refraction - Usefulness of various methods in finalizing the prescription - Special conditions – i) Infants, Toddlers and children ii) Amblyopia and Strabismus iii) Anisometropia and Aniseikonia iv) High refractive errors v) Irregular corneal astigmatism vi) The Elderly patients with low vision	**10**
10	Contrast Visual Acuity – Evaluation and management	**5**
TOTAL		**80**

Dispensing Optics

SL NO	TOPICS	HOURS
1	**Ophthalmic Lens** - Ophthalmic lens materials and characteristics of lenses - Power specification and measurements - Ophthalmic Prisms and manufacturing - Lens forms and analysis - Verification and ordering, prescription writing - Aberrations in Ophthalmic lenses - Protective Eye wares and suggestions - Lens coating and types Lenses for high refractive errors	**20**
2	Introduction , Properties and Types of - Absorptive lenses - Aspheric lenses - Lenses for high refractive errors - Multifocal	**15**
3	.**Introduction, Types and properties of** - Metal frames - Plastic frames - Mountings - Special purpose frames Eye wear designing and dispensing Standard alignment , Frame repairs and modifications Market availability frames and scope at global level International standards of frame manufacturing Face measurement methodologies Frame measurement methodologies	**20**
4	Specialty dispensing - Children - Anisometropia - Anisokonia - Facial asymmetry - Mentally retarded patients - Cosmetic dispensing	**15**
5	Sports Vision therapy and aids	**10**
TOTAL		**80**

Reference Books:Applied optics

VISUAL OPTICS

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

Dispensing Optics

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, 3rdedition, Butterworth - Heinemann, 2007

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

PRACTICALS 200 Hours

1. Visual acuity
   - ✓ Measurement & recording (Distance & Near)
2. Retinoscopy – Practice of retinoscopy (Dry & wet) in
   - ✓ Emmetropia, Myopia, Hypermetropia, Astigmatism, Anisometropia, Presbyopia, Aphakia, Pseudophakia, media opacities, strabismus & Eccentric fixation
   - ✓ Interpretation of retinoscopic findings
   - ✓ Subjective verification
   - ✓ Prescription writing
   - ✓ Methods of differentiating axial Vs Refractive ametropia
   - ✓ Dynamic retinoscopy – Methods
3. Accommodation & Convergence
   - ✓ Measurement of range & Amplitude of accommodation
   - ✓ Measurement of Near point of Convergence
4. Measurements of assorted faces for spectacle
5. Lens faults inspections
6. Frame manipulation and repair
7. Glazing
8. Special lenses- examination of specimens

THEORY EXAMINATION

(1 PAPER -100 marks - 3 hours duration - having 2 sections of 50 Marks each)

PAPER II- Applied Optics

Section A -- Visual Optics **50 marks**
Section B – Dispensing Optics **50 Marks**

QUESTION PAPER MODEL

Section A Visual Optics

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

Section B Dispensing Optics

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

PRACTICAL EXAMINATION **(100 marks)**

Spotters -

Case history & examination -

I. Qualitative - 30 Marks

II. Techniques - 40 Marks

III. Quantitative - 30 Marks

Viva Voce –50 marks (Both internal & external examiners shall conduct the practical & viva voce examination)

Clinical Optometry

Ocular Diagnostic instrumentation

SL NO	TOPICS	HOURS
1	• General outline of case paper for various requirements • Optometry OPD – private and hospital requirement • - Contact lens clinic , orthoptic clinic , low vision clinic	5
2	The patient history – Components and their significance	5
3	Preliminary examination procedures - Visual acuity and color vision - Contrast visual acuity - Ocular motility	5
4	Slit lamp biomicroscopy – accessories and attachments	5
5	Vision screening – advanced methodologies	5
6	Refraction Instruments – Latest designs and features available - Vision test charts , projection charts and illumination of consulting room - Trial sets and refractor units	5
7	Orthoptic instruments – Latest designs and features available	10
8	Retinoscope – Latest designs and features available	10
9	Contact lens related instruments – application and latest designs - Tearscope - Radiuscope	10
10	Special tests - Brightness acuity test - Vision analyzer - Video acuity test - Potential acuity meter - Aberrometer - Interferometer	10

11	Corneal examination techniques , Interpretation and correlations - Keretoscopy - Topography - Pachymetry - Advanced techniques - Degeneration and dystrophy - Dry eye – diagnosis and management	**15**
12	Anterior chamber and angle – Evaluation techniques, interpretations and correlations - Gonioscopy - Tonometry	**10**
13	Posterior segment - Evaluation techniques, interpretations and correlations - Ophthalmoscopy – Direct and Indirect - Ophthalmic ultrasonogrpahy - OCT - FFA - Fundus photography - NFA/GDx	**15**
14	Visual field examination - Evaluation techniques, interpretations and correlations - Screen perimetry - Automated perimetry	**10**
15	Clinical Electrophysiology - Evaluation techniques, interpretations and correlations - ERG - EOG - VER	**10**
16	Refractive surgeries – theory and practical aspects - LASIK - LASEK	**10**
17	Pediatric Optometry - Set up - Verities of test types and evaluation - Investigative methodologies - Visual aids and therapies – In clinic , at home - Referral to Ophthalmologist Geriatric Optometry Ocular Prosthesis – Artificial eye	**10**
TOTAL		**150**

OCULAR DISEASES

SL NO	TOPICS	HOURS
1	**EYELIDS** □□Eyelid anatomy □□Congenital and developmental anomalies □□Blepharospasm □□Ectropion □□Entropion □□Trichiasis and symblepharon □□Eyelids tumors □□Ptosis □□Eyelid trauma	**10**
2	**LACRIMAL SYSTEM** □□Lacrimal anatomy □□Lacrimal pump □□Methods of lacrimal evaluation □□Congenital and development anomalies of the lacrimal system □□Lacrimal obstruction □□Lacrimal sac tumors □□Lacrimal trauma	**8**
3	**SCLERA, EPISCLERA** □Ectasia and staphyloma □□Scleritis and episcleritis	**5**
4	**ORBIT** □□Orbit anatomy □□Incidence of orbital abnormalities □□Methods of orbit examination □□Congenital and developmental anomalies of the orbit □□Orbital tumours □□Orbital inflammation □□Sinus disorders affecting the orbit □□Orbital trauma	**8**
5	**CONJUNCTIVA AND CORNEA** □□Inflammation □□Therapeutic principles, Specific inflammatory diseases □□Tumors □□Tumors of epithelial origin □□Glandular and adenexal Tumors □□Tumors of neuroectodermal origin □□Vascular Tumors □□Xanthomatous origins □□Inflammatory tumors □□Metastatic lesions	**10**

6	**DEGENERATIONS AND DESTROPHIES** □□Definitions □□Degeneration's □□Dystrophies □□Corneal Dystrophies □□Miscellaneous conditions □□Keratoconjunctivitis Sicca (K.Sicca) □□Tear function tests □□Steven- Johnson's syndrome □□Ocular Rosacea □□Atonic eye disorders □□Benign mucosal pemphigoid (BMP)-ocular Pemphigoid □□Vitamin A deficiency □□Metabolic diseases associated with corneal changes.	**10**
7	**IRIS, CILIARY BODY, PUPIL** □□Congenital anomalies □□Primary and secondary disease of the iris and ciliary body □□Tumors □□Anomalies of pupillary reaction	**5**
8	**CHOROID** □□Congenital anomalies of the choroid □□Diseases of the choroid □□Tumors	**5**
9	**LENS** □□Anatomy and pathophysiology □□Normal anatomy and aging process □□Developmental defects □□Acquired lenticular defects ▪ Management of lenticular defects	**9**
10	**VITREOUS** □□Developmental abnormalities □□Hereditary hyaloidretinopathies □□Juvenile retinoschisis □□Asteroid hyalosis □□Cholestrolosis □□Vitreous hemorrhage □□Blunt trauma and vitreous □□Inflammation and vitreous □□Parasitic infestations □□Pigment granules in the vitreous □□Vitreous complications in cataract surgery.	**10**

11	**RETINA** □□Retinal vascular anomalies □□Diseases of the choroidal vasculature, Bruch's membrane, and retinal pigment epithelium □□Retinal tumors □□Retinal vascular abnormalities □□Retinal and optic nerve head astrocytomas □□Lymphoid tumors □□Other retinal disorders □□Retinal inflammations □□Metabolic diseases affecting the retina. □□Electromagnetic effects on the retina □□Retinal physiology and psychophysics □□Hereditary macular disorders (including albinism) □□Peripheral retinal degeneration's □□Retinal holes and detachments □□Intraocular foreign bodies. □□Photocoagulation	**10**
12	**GLAUCOMA** □□An over view of glaucoma □□Aqueous humor dynamics □□Intraocular pressure □□Evaluation of the optic nerve head □□Visual fields □□Glaucoma screening □□Classification of glaucoma □□Primary open angle glaucoma □□Primary angle closure glaucoma □□Primary congenital glaucoma □□Secondary glaucoma □□Principles of medical therapy □□Other modalities of glaucoma treatment □□Surgical treatment for glaucoma. □□Laser treatment for glaucoma.	**10**
TOTAL		**100**

SYSTEMIC DISEASES

SL NO	TOPICS	HOURS
1	**ARTERIAL HYPERTENSION** • Pathophysiology, classification, clinical examination, diagnosis, complications and management • Hypertension and the eye	5
2	**DIABETES MELLITUS** • Pathology, classification, clinical features, diagnosis, complications and management. • Diabetes mellitus and the eye.	10
3	**ACQUIRED HEART DISEASE-EMBOLISM** Rheumatic fever-Pathophysiology, classification, diagnosis, complications and Embolism Subacute bacterial endocarditis	5
4	**CANCER-INTRODUCTION** Definitions, nomenclature, characteristics of benign and malignant neoplasm. Grading of staging of cancer, diagnosis principles of treatment. Neoplasm of the eye	5
5	**CONNECTIVE TISSUE DISEASE** Anatomy and Pathophysiology: Arthritis Eye and connective tissue disease.	5
6	**THYROID DISEASE** Anatomy and physiology of thyroid gland, Classification of thyroid disease. Diagnosis, complications, clinical features, management, thyroid disease and the eye.	5
7	**TUBERCULOSIS** Etiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment Tuberculosis and the eye	5
8	**HELMINTHIASIS** Classification of helimenthic diseases, schistosomiasis, principles of diagnosis and management. Helimenthic disease and the eye (Taenia, echinococcus, larvae migraines)	5
9	**COMMON TROPICAL AILMENTS (Malaria, leprosy etc.)** Introduction to tropical diseases; Malaria. Tropical diseases and the eye – leprosy, toxoplasmosis, syphilis, trachoma.	5
TOTAL		**50**

PRACTICALS 200 Hours

1. History of the ophthalmic subject
    1.1. Ocular history
    1.2. Medical history
    1.3. Family history
    1.4. Systemic history
2. Assessment of visual acuity
    2.1. Distance & Near visual acuity
    2.2. Color vision & Contrast sensitivity
3. Examination of Extra Ocular Muscle balance
4. Assessment of accommodation & Convergence
5. Pupil evaluation & Measurement of Inter pupillary distance (IPD)
6. Slit Lamp examination
    6.1. Examination of eye lids, conjunctiva & sclera
    6.2. Examination of cornea & lens
    6.3. Examination of iris, Ciliary body & pupil
7. Examination of Intra ocular pressure
8. Assessment of angle of anterior chamber
9. Ophthalmoscopy – Direct & Indirect
10. Optic disc evaluation

11. Examination of Lacrimal system
12. Examination of orbit
13. Clinical Electrophysiology
14. Macular function tests
15. Visual field charting – Central & Peripheral
16. Refractive surgery Assessment

Reference/Text Books:

1. Corneal topography in the wave front Era – A guide for clinical application - M. Wang
2. James Wolffsohn : Eye Essentials Ophthalmic Imaging ,
3. Roger Steinert MD, David Huang : Anterior Segment Optical Coherence Tomography
4. Optical Coherence Tomography: Principles and Applications - Mark Brezinski
5. Wavefront analysis aberrometers and corneal topography - Benjamin F.Boyd
6. Ophthalmologic Ultrasound, An Issue of Ultrasound Clinics - Arun D.Sing
7. Parsons Diseases of the Eye - Stephen J. Miller
8. Clinical Ophthalmology: A Systematic - Jack J. Kanski
9. Ophthalmology - Myron Yanoff and Jays Duker

PAPER III: Clinical Optometry

Section- A: Ocular Diagnostic instrumentation 50 Marks

Type of questions and distribution of marks for each section carrying 50 marks

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

Section- B: OCULAR & SYSTEMIC DISEASES 50 Marks

Type of questions and distribution of marks for each section carrying 50 marks

Type of questions	No of questions	Marks for each questions	Total
Long Essay	05	10	50

PRACTICAL EXAMINATION **Total-100 Marks**

1 **PRACTICAL EXAMINATION** **(100 marks)**

Spotters
Case history & examination

I. Qualitative - 30 Marks

II. Techniques - 40 Marks

III. Quantitative - 30 Marks

Viva Voce –50 marks (Both internal & external examiners shall conduct the practical & viva voce examination)

****SUBSIDIARY SUBJECTS I YEAR**

1. **BIOSTATISTICS** **30 HOURS**

1. Introduction to Biostatistics- definition, role of statistics in health science and health care delivery system.
2. Sampling Population, sample, sampling, reasons for sampling, probability and non-probability sampling.
Methods of probability sampling- simple, random, stratified, systemic- procedure, merits and demerits
Use of random number table.

1. Organization of data
   Frequency table, histogram, frequency polygon, frequency curve, bar diagram, pie chart
2. Measures of location Arithmetic mean, median, mode, quartiles and percentiles definition, computation (for raw data), merits, demerits and applications
3. Measures of variation
   Range, inter quartile range, variance, standard deviation, coefficient of variation- definition, computation (for raw data), merits, demerits and applications
4. Basic probability distributions and sampling distributions

Concept of probability distribution. Normal, Poisson and Binomial distributions, parameters and application. Concept of sampling distributions. Standard error and confidence intervals. (Skewness and kurtosis)

5. Tests of significance
   Basic of testing of hypothesis Null and alternate hypothesis, type I and type II errors, level of significance and power of the test, p value.
   Tests of significance (parametric) t test (paired and unpaired), Chi square test and test of proportion, one way analysis of variance.
6. Correlation and Regression
   Scatter diagram, concept and properties of correlation coefficient, examples (No computation Simple correlation) Pearson's and Spearman's, testing the significance of correlation coefficient. Linear and multiple regression.

Suggested books:

a. Lwanga SK Cho- Yook Tye (Editors). Teaching Health Statistics, Twenty lessons and seminar outlines. World Health Organisation, Geneva
b. Mahajan BK, Methods in Biostatistics for medical students and research workers. 6th Edition, Jaypee Brothers medical Publishers, New Delhi, 1997
c. Sunder Rao PSS and Richard J. Introduction of Biostatistics; A Manual for students in Health sciences. Prentice- Hall of India Pvt. Ltd, New Delhi.
d. N. S. N. Rao: Elements of Health Statistics

STATISTICS PRACTICALS: 10 HOURS

1. Collection and tabulation of data
2. Graphical representation of data
3. Correlation and regression analysis
4. Student's 't' test
5. Chi-square test
6. ANOVA

1. RESEARCH METHODOLOGY
20 HOURS

AIM
The aim of this module is to provide the student with experience of research methods and techniques while working alongside research laboratory staff on a designated research project.

OBJECTIVES
By the end of this Study Module, students should be able to:

I. Design, carry out, write up and critically appraise a selected research topic
II. Demonstrate knowledge of skills in appropriate research laboratory practices
III. Carry out a range of laboratory techniques using appropriate methodologies

CONSTITUENCY
These module are intended for students who wish to learn research methods and techniques and perhaps do a PhD in the future. Some experience of laboratory practice would help the student to take full advantage of this module, although in most instances, students will be fully trained in all necessary techniques.

CONCEPTUAL OUTLINE
This is a purely practical module designed to introduce students to a variety of research techniques and to give them the opportunity of using these techniques in conducting a novel research project. Students will choose research projects and will be directly supervised by an expert in the field. This module will necessitate long working hours in some cases and may involve some students studying at institutions other than the parent institution.

TEACHING STRATEGY
This module is entirely laboratory based, with no formal teaching or lectures. Teaching is on a one- to – one basis with a designated supervisor. Students must be highly motivated and be prepared to work long hours in order to make a success of this module.

REVIEWING THE LITERATURE
Aim:
This Study Module aims to describe and illustrate the methods available for identifying- and reviewing quantitative and qualitative literature.

Objectives:
By the end of the Study Module, students should be able to:

a. Carry out an appropriate, rigorous review of the literature; and
b. Understand the strengths and weaknesses of different methods of identifying, assessing and synthesizing literature.

Conceptual outline:
This module will cover all stages in carrying out an appropriate and rigorous review.

a. Planning the review: the role of the literature review and specification of the task

b. Identification of relevant literature, both published and unpublished: developing a search strategy and using bibliographic databases
c. Appraising the literature: methods for assessing the quality of quantitative and qualitative research
d. Synthesizing the evidence: integration of the evidence using both quantitative and qualitative methods; principles of meta- analysis
e. Formulating recommendations and writing the review

Teaching strategy:
The technical aspects of literature reviewing will be presented in lectures and computer practicals, using some of the databases available through the RGUHS's HELINET network. The format of the seminars will encourage both a practical application and critical appraisal of methods. Each student can choose his or her own topic and question for their assessed literature review. Students should consider possible topics and questions in preparation for the Study Module. There will be three sessions during the Study Module for general advice on the assessment.

Reference Books:
1. Introduction to Biostatistics & Research :- P.S.S Sundar Rao & R. Richard

2. Research Methodology :- C. R Kothari

3. Methods of Biostatistics :- B.K Mahajan

OCCUPATIONAL OPTOMETRY & PUBLIC HEALTH OPTOMETRY

SL NO	TOPICS	HOURS
1	Visual and general ergonomics	10
2	Anthropometry	10
3	Computer Vision Syndrome and management	10
4	Sports vision	10
5	Physical & Chemical Hazards, Radiation effects	10
6	Visual fitness & Legal aspects	10
7	Optometry's role in healthcare system – In India & Comparison with other countries	10
8	Epidemiology of occupational eye diseases & Injuries	10
9	Occupational eye disease management	10
Total		90

Reference Books:

1. Environmental Vision : Interactions of the Eye, Vision, and the Environment - Donald G. Pitts, Robert N. Kleinstein

2. Work and the eye : Rachel V. North

3. Sports vision: vision care for the enhancement of sports performance - Graham B. Erickson

4. Elite Sports and Vision : Ajay Kumar Bhootra, Sumitra

COURSE CONTENT

SECOND YEAR Master Of Optometry

Advanced contact lens

SL NO	TOPICS	HOURS
1	Introduction - Ocular anatomy and physiology related to contact lens - Corneal changes caused by contact lens - Tears and contact lens - RGP Contact Lens – Review of material, fitting, evaluation, assessment, modification, complications and deposits. - Soft contact Lens – Review of material, fitting, evaluation, assessment, modification, complications and deposits	15
2	Latest Trends in Contact Lens - Material - Manufacturing	10
3	Toric Lenses - Rigid - Indication - Forms of toric lens - Criteria - Design considerations - Optical considerations	10
4	Toric Lenses - Soft - Indication - Forms of soft lens - Criteria - Design considerations - Principles of correction - Planned replacement of soft toric lenses - Limitation of soft toric lenses	10
5	Extended wear lenses - Introduction - Ocular environment - Oxygen requirement - Soft contact lenses - Rigid gas permeable lenses - Risk in extended wear contact lens	10
6	Bifocal and Multifocal contact lens - Introduction - History - Preliminary evaluation and patient selection - Presbyopic contact lens option - Design – RGP and soft - Patient education and follow-up care	10

7	Contact lens verification - Instrument calibration - Lens specification - Radii , eccentricity and edge left - Aberrations of rigid and soft contact lenses	**10**
8	Contact lens after care - Interviewing and history taking - Symptom analysis - Contact lens – Preservation, cleaning and disinfections - Evaluation – Allergy, Adnexal and corneal complications related to aftercare - Contact lens complications - Biochemistry of contact lens solutions Contact Lens related ocular microbiology & Immunology	**10**
9	Contact lens in other abnormal ocular conditions - Introduction - Therapeutic mechanism of contact lens - Selection of therapeutic lens - Lens materials and fitting - Patient Follow – Up - Conditions – Benefits of therapeutic contact lenses and lens type a) Bullous keratopathy b) Fuchs' endothelium dystrophy c) Anterior membrane dystrophy d) Thygeson's SPK e) Filamentary keratitis f) Epithelium defects and stromal ulceration g) Neuroparalytic and Neurotrophic conditions h) Corneal thinning and perforation i) Cicatrizing Conjunctival diseases j) The dry eye k) Drug delivery ▪ Contact lens complications & Management	**25**
10	Orthokeratology - Theory and formulation - Applications	**10**
11	Speciality contact lens • Keratoconus • High Perceptions • Post keretoplasty contact lens fitting • Post refractive surgery contact lens fitting (Post LASIK, Post PKP, Post RK etc • Pediatric Contact Lens	**30**

	• Cosmetic and Prosthetic Contact lens • Scleral Lenses • Rose-K lenes • Medical aspects of Contact lens I. Diagnose II. Treatments • Modification Procedures • Contact lens correlations and myopia progression • Special types of contact lens and their uses • Legal issue and Contact Lens • Setting up a research projects • Tinted Contact Lens • Practice management • Patient management	
TOTAL		**150**

PRACTICALS 700 Hours

1) Rigid Contact lens fitting in Simple refractive errors
2) Soft contact lens fitting in Simple Refractive errors
3) Bifocal fitting
4) Scleral contact lens fitting
5) Orthokeratology
6) Postrefractive surgery
7) Postkeratoplasty fitting
8) Abnormal cornea
9) Cosmetic contact lens
10) Bandage lens fitting

Reference Books:

1. Contact Lenses — Anthony.J.Philips, Janet Stone
2. Textbook of Contact Lenses — V.K.Dada – 4th Edition
3. Contact Lens Practice — Ruben & Guillon
4. Color Atlas of Contact Lenses — Montague Ruben
5. Contact Lens – The CLAO Guide — Peter.R.Castle
6. IACLE – Contact lens modules (10 Nos) — International Association of Contact Lens Educators
7. Manual of Contact Lens prescribing & Fitting — Milton.M.Hom – 3rd edition
8. Manual of Gas permeable contact lens — Edward.S.Bennet, Milton.M.Home
9. Clinical manual of specialized CL Prescribing — Terry.R.Scheid
10. Clinical Contact Lens Practice — Edward.S.Bennet,

SCHEME OF EXAMINATION Master Of Optometry II year
Advanced contact lens

I. THEORY EXAMINATION: papers of 3 hrs duration, carrying 100 marks each.

Advanced contact lens Duration : 3 Hrs Max Marks:100

Type of questions	**No of questions for each subject**	**No of questions and marks for each question**	**Total Marks**
Long Essay	10	10x10	100

II. PRACTICAL EXAMINATION: Max. Marks 100

Spotters
Case history & examination

I. Qualitative - 30 Marks

II. Techniques - 40 Marks

III. Quantitative - 30 Marks

III. VIVA-VOCE-50 Marks

1. Theory topics in syllabus to be covered by internal and external examiners (50marks)

Grand Total -150 marks

Master Of Optometry II YEAR – PAPER II (THEORY)

Low Vision and Rehabilitation

SL NO	TOPICS	HOURS
1	Visual Disorders – Medical Perspective a. The Epidemiology of Vision Impairment b. Vision Impairment in the pediatric population c. Ocular Diseases : i. Age – Related Cataract, ii. Glaucoma iii. ARMD iv. Diabetic retinopathy v. Corneal Disorders vi. Ocular Trauma vii. Sensory Neuro-ophthalmology and Vision Impairment Refractive Disorders	10
2	Visual Disorders – The Functional Perspective a. Low Vision and Psychophysics b. Visual Functioning in Pediatric Populations with Low Vision c. Perceptual correlates of Optical Disorders d. Functional aspects of Neural Visual Disorders of the eye and Brain e. Visual Disorders and Performance of specific Tasks requiring vision	10
3	Visual Disorders – The Psychosocial Perspective d. Developmental perspectives – Youth e. Vision Impairment and Cognition f. Spatial orientation and Mobility of people with vision impairments g. Social skills Issues in vision impairment h. Communication and language : Issues and concerns i. Developmental perspectives on Aging and vision loss Vision and cognitive Functioning in old	10
4	Interactions of Vision Impairment with other Disabilities and sensory Impairments. j. Children with Multiple Impairments k. Dual Vision and Hearing Impairment l. Diabetes Mellitus and Vision Impairment m. Vision Problems associated with Multiple Sclerosis	10

	n. Vision Impairment related to Acquired Brain Injury o. Vision and Dementia p. Low Vision and HIV infection	
5	The Environment and Vision Impairment: Towards Universal Design q. Indian Disabilities act r. Children's Environments s. Environments of Older people t. Outdoor environments u. Lighting to enhance visual capabilities v. Signage and way finding w. Accessible Environments through Technology	**10**
6	Vision Rehabilitation: x. In Western Countries y. In Asia z. Personnel preparation in Vision Rehabilitation	**5**
7	2) Psychological and social factors in visual Adaptation and Rehabilitation a. The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Children and Youth b. The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Adults and Older adults c. Social support and adjustment to vision Impairment across the life span d. The person – Environment perspective of vision impairment e. Associated Depression, Disability and rehabilitation f. Methodological strategies and issues in social research on vision Impairment and rehabilitation	**15**
8	Habilitation of Children and Youth with vision Impairment	**5**
9	Rehabilitation of working –age Adults with Vision Impairment	**5**
10	Rehabilitation of older Adults with Vision Impairment	**5**
11	Functional consequences of vision Impairment	**5**
12	Vision evaluation of Infants	**5**
13	Educational assessment of visual function in Infants and Children	**5**
14	Functional Evaluation of the Adult	**5**
15	Functional orientation and Mobility	**5**

16	Functional Assessment of Low Vision for Activities of Daily living	**5**
17	Psychosocial assessment of adults with vision impairment	**5**
18	Assistive Devices and Technology for Low Vision	**5**
19	Assistive Devices and Technology for Blind	**5**
20	Vision and Reading - Normals Vs Low Vision	**5**
21	Clinical Implications of color vision Deficiencies	**5**
22	Electro diagnosis in evaluating and managing the low vision patient	**5**
23	Documentation and report preparation	**5**
TOTAL		**150**

PRACTICALS 700 Hours

Low Vision Clinics:

1) Low vision clinics
2) Spastic children evaluation
3) Low vision screening camp
4) Integrated/Inclusive/Special school posting for a week period.
5) Case report – submitting and presentations

TEXT/ REFERENCE BOOKS:

1. Clinical Low Vision — Elenor E. Faye
2. Vision & Ageing book — Alfred A. Rosenbloom

SCHEME OF EXAMINATION Master Of Optometry II year
Low Vision and Rehabilitation

I. THEORY EXAMINATION: papers of 3 hrs duration, carrying 100 marks each.

Low Vision and Rehabilitation Duration : 3 Hrs
Max Marks:100

Type of questions	No of questions for each subject	No of questions and marks for each question	Total Marks
Long Essay	10	10x10	100

II. PRACTICAL EXAMINATION: Max. Marks 100

Spotters
Case history & examination

I. Qualitative - 30 Marks

II. Techniques - 40 Marks

III. Quantitative - 30 Marks

III. VIVA-VOCE-50 Marks

1. Theory topics in syllabus to be covered by internal and external examiners (50mks)

Grand Total -150 mks

Master Of Optometry II YEAR – PAPER III (THEORY)

Advanced binocular vision & Pediatric Optometry

SL NO	TOPICS	HOURS
1	• Refractive Development: a. Early Refractive Development b. Visually Guided control of Refractive State: Animal Studies c. Infant Accommodation and Convergence	10
2	• Oculomotor Function: a. Conjugate Eye Movements of Infants b. Development of the Vestibuloocular and Optokinetic reflexes	10
3	• Spatial and Chromatic Vision: a. Front-end Limitations to Infant Spatial vision: Examination of two analyses b. Development of the Human Visual Field c. Development of Scotopic Retinal Sensitivity d. Infant Color vision e. Orientation and Motion selective Mechanisms in Infants f. Intrinsic Noise and Infant performance	10
4	• Binocular Vision: a. Development of interocular vision in Infants b. Stereopsis in Infants and its developmental relation to visual acuity c. Sensorimotor Adaptation and Development of the Horopter d. Two stages in the development of Binocular Vision and Eye Alignment	10
5	Retinal and cortical Development	5
6	Abnormal Visual Development:	5
7	What next in Infant Research:	5
8	• Clinical Applications: a. Assessment of Child Vision and Refractive Error b. Refractive Routines in the Examination of Children c. Cycloplegic Refraction	20

	d. Color Vision Assessment in Children e. Dispensing for the Child patient f. Pediatric Contact Lens Practice g. Dyslexia and Optometry Management h. Electrodiagnostic Needs of Multiple Handicapped Children i. Management Guidelines – Ametropia, Contant Strabismus j. Management Guidelines – Amblyopia k. Accommodation and Vergence anomalies l. Nystagmus m. Common genetic problems in Pediatric optometry n. Pediatric Ocular Diseases o. Ocular Trauma in Children p. Myopia control q. Clinical uses of prism	
9	Clinical Conditions 9.1 Strabismus and Amblyopia 9.1.1 Amblyopia □ Anisometropic / Isometropic Refractive Amblyopia □ Strabismic Amblyopia □ Hysterical Amblyopia □ Form Deprivation Amblyopia □ Differential diagnoses in childhood visual acuity loss 9.1.2 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.)	**15**

	• Differential diagnoses in strabismus Special clinical considerations • Anomalous Correspondence • Eccentric Fixation • Suppression • Motor Ranges • Stereopsis • Horror fusionalis /intractable diplopia	
10	10.1 Perception and Information Processing 10.1.1 Neurological / Psychological Ambient / focal systems. Visual perceptual midline Parvo cellular / Magno cellular function Perceptual Style (central, peripheral) Impact of colored filters Attention 10.1.2 Intersensory and Sensorimotor Integration Visual-auditory Visual-vestibular Visual-oral Visual-motor Visual-tactual 10.1.3 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	**15**
11	11.1 Refractive conditions and visual skills 11.1.1 Refractive Conditions Developmental influence on refraction & emmetropization Aniseikonia Myopia Astigmatism Hyperopia 11.1.2 Ocular Motor Function	**15**

	Eye movements and reading Pursuit dysfunctions Nystagmus Saccadic Dysfunctions 11.1.3 Accommodation Role in myopia development Role in computer-related asthenopia 11.1.4 Fusion in Non-Strabismic Conditions Fixation disparity	
12	12.1 Special clinical conditions 12.1.1 Acquired brain injury (traumatic brain injury {TBI} and stroke) 12.1.2 Developmental disabilities (Down Syndrome, Developmental delay, etc.) 12.1.3 Visually induced balance disorders 12.1.4 Motor disabilities (Cerebral Palsy, ataxia, etc.) 12.1.5 Behavioral disorders 12.1.6 Autism spectrum disorders 12.1.7 ADD / ADHD 12.1.8 Dyslexia and specific reading disabilities 12.1.9 Learning Disabilities 12.1.10 Computer Vision Syndrome	**15**
13	Vision Therapy Concepts to Consider 13.1 Peripheral awareness: 13.1.1 focal / ambient roles 13.1.2 Significant findings which are good or poor prognostic indicators of vision therapy and lens application 13.1.3 Development, rehabilitation, prevention, enhancement 13.1.4 Behavioral lens application 13.1.5 Yoked prism rationale for treatment and application 13.1.6 The relationship between the visual and vestibular systems 13.1.7 SILO/SOLI 13.1.8 Visual stress and its impact on the visual system 13.1.9 Role of posture in vision development, comfort and performance 13.1.10 Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool. 13.1.11 Relationship of speech-auditory to vision 13.1.12 How television, reading, video gaming might restrict movement, computer work, nutrition, etc., impact vision? 13.1.13 Perceptual Style, e.g., spatial/temporal, central/peripheral	**15**
TOTAL		**150**

Practical topics

· Demonstration of the Sensory tests, Worth 4 dot test, Bagolini striated glass test, Maddox rod test, Red filter test, Synaptophore, 4 prism base out test, After image test, Stereopsis test,

· Demonstrations of the Motor tests, EOM, Bruckner test, Hirschberg test, Krimsky test, Modified Krimsky test, Cover test, Cover uncover test, Alternate cover test, Prism bar covet test, Phoria measurement (Maddox rod test, Modified Thorington method, Von Graefe technique, AC/A ratio, Oculomotor test (Saccadic & Pursuit test)

· Demonstration of Accommodation tests, Amplitude of Accommodation (Push up method, Pull away method, Minus lens method, Modified push up method), Negative relative Accommodation, Positive relative accommodation, Accommodative Facility, MEM

· Demonstration of Vergence tests, Near point of Convergence, Fusional Vergence, Vergence Facility

· Demonstration of History taking in strabismus patients

· Demonstration of Paralytic squint evaluation: Diplopia charting, Hess charting, Less charting, Head tilt test, Past pointing, Binocular fields of fixation, Forced duction test, Active force generation test.

· Demonstration of Visual perceptual or Visual information processing tests.

· Vision Therapy clinic
· Special children evaluation
· Special children screening camp
· Case report – submitting and presentations

SCHEME OF EXAMINATION Master Of Optometry II year
Advanced binocular vision & Pediatric Optometry

I. THEORY EXAMINATION: papers of 3 hrs duration, carrying 100 marks each.

Advanced binocular vision & Pediatric Optometry Duration : 3 Hrs
Max Marks:100

Type of questions	No of questions for each subject	No of questions and marks for each question	Total Marks
Long Essay	10	10x10	100

II. PRACTICAL EXAMINATION: Max. Marks 100
Spotters
Case history & examination

I. Qualitative - 30 Marks
II. Techniques - 40 Marks
III. Quantitative - 30 Marks
III. VIVA-VOCE-50 Marks

1. Theory topics in syllabus to be covered by internal and external examiners (50mks)

Grand Total -150 mks

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

JOURNALS

- Eye and Contact Lens; Science and Clinical Practice
- Review of Optometry
- Contact Lens Spectrum
- Contact Lens Journal
- Contact Lens and Anterior eye

SECTION- IV

PROJECT GUIDELINES

All master's degree students enrolled in the Rajiv Gandhi University of Health Sciences should complete a scholarly project as partial fulfillment of requirements for the award of **Master Of Optometry** degree.

What is a project?

A Project is a preliminary form of research. It is an independent investigation. It is very largely the students's own work and is to be pursued by them from the inception till completion. A master's project (non-thesis) will be completed during the second year and involves the student in a hands- on project led by a research supervisor/ faculty advisor who will choose, develop and guide the project from its inception to completion.

Purpose of a project work

The purpose of the Project Work is to enable the student to gain practical experience. It enables the student to meet program objectives through development of an appreciation of the interrelations between theory research and practice. A project forms an introduction to scientific thinking and working.

Project suggestions

Prior to the practical work, students work out a concept with their supervisor that could include any of the following points:

- Scientific question
- Educational objectives (which methods have to be mastered and understood)
- Recent trends in the respective fields
- Case study
- Prospective studies
- Retrospective studies

This scholarly project provides the student with the opportunity to participate in a mentored research experience. The student will actively participate in a research project throughout all current applicable phases of the project such as the problem statement development, review of the literature, hypotheses formation, proposal writing, study design, data collection, data analysis, and result reporting. This may be done as a group project. A portfolio, paper, or poster is a presentation of those outcomes.

Project supervision

The supervisor schedules the project work together with the student and provides an introduction to all laboratory skills that are needed. She or he is then the contact person for all questions and problems during the project. If required, she or he may also ask for a progress report and preliminary results while the project is still ongoing.

The eligibility academic qualification and teaching experience required for recognition as research supervisor and faculty advisor by the RGUHS are:

a. **Eligibility to be a research supervisor and faculty advisor**
   Shall be a full time teacher in the college or institution where he or she is working.
b. **Academic qualification and teaching/professional experience for each branch**
   - Research supervisor (RS)- five years of teaching/ professional experience after the postgraduate qualification in a teaching institution or laboratory approved by RGUHS
   - Faculty advisor (FA)- three years of teahing/ professional experience after the postgraduate qualification in a teaching institution or laboratory approved by RGUHS
c. **Age:**
   The age of the RS/ FA shall not exceed 65 years.

Assessment

Four copies of the project report should be submitted to the Principal along with a soft copy (CD), three months before the final examinations. Projects are assessed with a written report and a seminar. The written report and the presentation, as well as the practical work in the laboratory are to be included in the internal assessment. The Project report will carry 10 marks which would be assessed and awarded during the viva voce examination and added along with the viva voce marks.

GUIDELINES FOR THE PREPARATION OF PROJECT REPORTS

1. The project report should be typed in Times New Roman. The size of the titles should be 14 and Bold and the size of the subtitles should be 12 and bold.
2. The matter should have double spacing except for long quotations, footnotes and endnotes, which are single spaced. The left hand margin must be 1.5", other margins should be 1.0".
3. The project report should be hardbound.
4. The project report should be organized in the following subdivisions:
   a. Title page
   b. Certificate
   c. Acknowledgement
   d. List of abbreviations used
   e. Table of contents
   f. Introduction
   g. Main project
   h. Summary of the project work
   i. List of references
   j. Annexures

a. Title page

<----------Title---------->
<----------Subtitle ---------- >

by

Name of the Candidate
Project Report
In partial fulfillment
of the requirements for the degree of
Degree Name
in
Subject Name

Under the guidance of

Name of the RS and FA

Name of the Department

Name of the College
Place
Year

b. Certificate

CERTIFICATE BY THE RESEARCH SUPERVISOR

This is to certify that the project report entitled "<----------Title----------> " is a bonafide research work done by Name of the Candidate in partial fulfillment of the requirement for the degree of Degree Name.

Signature of the Research Supervisor

Name

Designation & Department

Date:
Place:

ENDORSEMENT BY THE HOD, PRINCIPAL/HEAD OF THE INSTITUTION

This is to certify that the project report entitled "<----------Title----------> " is a bonafide research work done by Name of the Candidate under the guidance of Name & designation of the Guide.

Seal & Signature of the HOD **Seal & Signature of the Principal**

Name **Name**

Date:

Place:

c. Acknowledgement

The inclusion of a paper of Acknowledgment is a traditional practice in the write up of the Project Work. This permits the candidate to write a brief perface and acknowledge the help received from persons and organizations.

d. List of abbreviations used

e. Table of Contents

f. Introduction

This section includes a brief write up about the topic, its scope and importance as well as relation to any previous studies done in the particular topic. It should also mention any present developments.

g. The main project

The main project should be divided into various sections as per the demand of the topic.

h. Summary of the project work

i. List of References (Vancouver Style)

References should be numbered consecutively in the order in which they are first mentioned in the text; they should not be listed alphabetically by author or title or put in date order.

j. Annexures

POINTS TO KEEP IN MIND

- The project work should be an original document and in the candidates own language.
- The candidate should not copy or reproduce any one else's published or unpublished project.
- Any arguments that are put forward in the project should be supported with appropriate data.
- Proper documentation of the information is very important.
- The methodology to be used should be very clearly stated in the beginning of the work.
- Plagiarism should be avoided.

WHAT IS PLAGIARISM?

Plagiarism means using another's work without giving credit.

SECTION- V

LEARNING AND TEACHING STRATEGY

An important aim of the program is to develop an autonomous and reflective primary eye care practitioner who is also able to recognize the importance of life-long learning both from a personal and professional viewpoint. Students are encouraged to explore the recent advances in the field of Optometry and apply it in the clinical practice through problem trouble shooting, analytical and evidence based approach to study.

The learning & teaching methods include

- Lectures
- Demonstrations
- Clinical patient management
- Independent collaborative self study
- Assignments/ Projects
- Seminars
- Case presentation
- Discussions
- Industrial visits & External clinical placements
- Journal Clubs
- Classroom teaching with the undergraduate students

CLINICAL POSTINGS

Aim:-
To enable students to learn Optometric assessment process, clinical reasoning skills & treatment techniques so that they become competent professionals

Description:

In the first year of the curriculum the students are posted on a rotatory basis in different clinical units of Ophthalmology, Contact lenses, Low vision aids & Pediatric clinic. The students will be under the supervision of experienced clinical supervisors in the speciality areas. During the second year, the students are placed for one month in outside eye institutes or clinical establishments for observership.

CLINICAL OBJECTIVES:

1) Evaluation of the patient
2) Plan and implementation of treatment plan.
3) Administration of standardized evaluation tools.
4) Documentation of evaluation and progress reports.
5) Clinical discussion with the undergraduates.
6) Case presentation and discussion.

MONITORING LEARNING PROGRESS

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is done by the staff of the department based on participation of students in various teaching/ learning activities. It may be structured and assessment shall be done using checklists that assess various aspects. Model Checklists are given in this chapter which may be copied and used.

The learning out comes to be assessed should include:

a. Acquisition of knowledge: the methods used comprise of 'Log Book' which records participation in various teaching/ learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisiors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so desired.

Journal Review Meeting (Journal Club): the ability to do literature search, in depth study, presentation skills, and use of audio- visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (see Model Checklist I, Section-V).

Seminars/ symposia: the topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio- visual aids are to be assessed using a checklist (see Model Checklist II, Section- V).

b. Teaching skills: candidates should be encouraged to teach undergraduate paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (see Model Checklist III, Section V).

c. Work diary/ Log Book- every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of experiments or laboratory procedures, if any conducted by the candidate.

d. Records: records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University.

Log Book

The log book is a record of the important activities of the candidates during his training, Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1 and 2 of Section V. Copies may be made and used by the institutions.

Procedure for defaulters: every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if he/she fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Format of Model Checklists

Checklist- I: MODEL CHECKLIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the student: Date:

Name of the faculty/ observer:

Sl. No.	Items of observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Article chosen was					
2	Extent of understanding of scope & objectives of the paper by the candidate					
3	Whether cross-references have been consulted					
4	Whether other relevant references have been consulted					
5	Ability to respond to questions on the paper/ subject					

6	Audio- visual aids used					
7	Ability to defend the paper					
8	Clarity of presentation					
9	Any other observation					
	Total score					

Checklist- II: MODEL CHECKLIST FOR THE EVALUATION OF THE SEMINAR PRESENTATIONS

Name of the student: Date:
Name of the faculty/ observer:

Sl. No.	Items of observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Topic chosen was					
2	Extent of understanding of scope & objectives of the paper by the candidate					
3	Whether cross-references have been consulted					
4	Whether other relevant references have been consulted					
5	Ability to respond to questions on the paper/ subject					
6	Audio- visual aids used					
7	Ability to defend the topic					
8	Clarity of presentation					
9	Any other observation					
	Total score					

Checklist – III:

MODEL CHECKLIST FOR EVALUATION OF TEACHING SKILL

Name of the student: Date:

Name of the faculty/ observer:

Sl no.		Strong Point	Weak Point
1	Communication of the purpose of the talk		
2	Evokes audience interest in the subject		
3	The introduction		
4	The sequence of ideas		
5	The use of practical examples and/or illustrations		
6	Speaking style (enjoyable, monotonous, etc., specify)		
7	Summary of the main points at the end		
8	Ask questions		
9	Answer questions asked by the audience		
10	Rapport of speaker with the audience		
11	Effectiveness of the talk		
12	Uses of AV aids appropriately		

Checklist- IV:

MODEL CHECKLIST FOR THE EVALUATION OF THE SEMINAR PRESENTATIONS

Name of the student: Date:

Name of the faculty/ observer:

Sl. No.	Points of observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Interest shown in selecting topic					
2	Appropriate review					
3	Discussion with guide and other faculty					
4	Quality of protocol					
5	Preparation of proforma					
	Total score					

Checklist- V:
CONTINOUS EVALUATION OF PROJECT WORK BY GUIDE/ CO- GUIDE

Name of the student: Date:
Name of the faculty/ observer:

Sl. No.	Points of observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Periodic consultation with guide/ co-guide					
2	Depth of Analysis/ Discussion					
3	Department presentation of findings					
4	Quality of Final Output					
5	Others					
	Total score					

OVERALL ASSESSMENT SHEET

Date:

Check list No.	Name of the students			
	A	B	C	D
1				
2				
3				

Signature of the HOD **Signature of the Principal**

The above overall assessment sheet used along with logbook should form the basis for clarifying satisfactory completion of course of study, in addition to the attendance requirement.

KEY
Mean score: Is the sum of all the scores of checklists 1 to 5
A, B, C: Name of the students

LOGBOOK

Table 1: Academic activities attended
Name:
Admission Year:
College:

Date	Type of activity, Specific Seminar, Journal club, presentation, UG teaching	Particulars

LOGBOOK

Table 2: Academic presentations made by the student's
Name:
Admission Year:
College:

Date	Topic	Type of activity, Specific Seminar, Journal club, presentation, UG teaching

MANAGEMENT INFORMATION SYSTEM REPORT

1. Name of the college imparting **Master Of Optometry** PG Program:
2. Details of **Master Of Optometry** Program

Sl. No.	Name of the Branch & Teaching faculty	Sanctioned Strength	Admitted	Name of the subjects to be studied at 1st Year **Master of Optometry**
1				
2				

3. No. of experiments/ assignments conducted for 1st year **Master of Optometry** students

Sl. No.	Branch		Subject	Assigned by RGUHS	Conducted	%	Remarks
1		No.	Name				
2							

4. No. of theory classes conducted for 1st year **Master of Optometry** students-

Sl. No.	Branch		Subject	RGUHS Norms (25)	Conducted	%	Remarks
1		No.	Name				
2							
3							

5. Number of theory and practical classes taken by 2nd year **Master of Optometry** students for under graduate Program (Optional)

6. No. of Journal clubs (department wise) for 1st year and 2nd year **Master of Optometry** students

Total No. of students Dept Wise	Norms for half yearly Report	AchievedNumber	% Achievement	Remarks
1st year **Master Of Optometry** No. =	2 per candidate per year			
2nd year **Master Of Optometry** No. =	2 per candidate per year			

7. No. of seminars for 1st year and 2nd year **Master Of Optometry** students

Total No. of students Dept Wise	Norms for half yearly Report	AchievedNumber	% Achievement	Remarks
1st year **Master Of Optometry** No. =	2 per candidate per year			
2nd year **Master Of Optometry** No. =	2 per candidate per year			

8. Number of interdepartmental meetings

Norms for half yearly Report	Achieved Number	% Achievement	Remarks
1	2	200%	Interactive and productive

9. Number of visits to pharmaceutical industry/ research center/ hospital for 1st year and 2nd year **Master Of Optometry** students

Norms for half yearly Report	Achieved Number	% Achievement	Remarks
1	2	200%	Educative and informative

10. Number of guest lectures for postgraduate program

Norms for half yearly Report	Achieved Number	% Achievement	Remarks
2	3	150%	Need focused and educative

11. Number of research papers published in the year in the college-
12. Any other additional information such as consultancy/ collaboration/ conducting Seminars & workshops or attending seminar and workshops or conference.

SECTION- VI

ETHICS IN Master Of Optometry

(Should be taught to the 1st year students of **Master Of Optometry**)

Introduction: With the advances in science and technology and the increasing needs of the patient, their families and community, there is a concern for the health of the community as a whole. There is a shift to greater accountability to the society. It is therefore absolutely necessary for each and every one involved in the health care delivery to prepare themselves to deal with these problems.

Standards of professional conduct for technicians are necessary in the public interest to ensure an efficient laboratory service. Every technician should not only be willing to play his part in giving such a service, but should also avoid any act or omission which would prejudice the giving of the services or impair confidence, in respect, for technician as a body.

To accomplish this and develop human values, it is desired that all the students under go ethical sensitization by lectures or discussion on ethical issues.

Introduction to ethics-
What is ethics?
General introduction to Code of Laboratory Ethics
How to form a value system in one's personal and professional life?
International code of ethics.

Ethics of the individual-
Technician in relation to his job
Technician in relation to his trade
Technician in relation to medical profession
Technician in relation to his profession

Professional Ethics-
Code of conduct
Confidentiality
Fair trade practice
Handling of prescription
Mal practice and Negligence
Professional vigilance

Research Ethics-
Animal and experimental research/ humanness
Human experimentation
Human volunteer research- informed consent
Clinical trials

Gathering all scientific factors
Gathering all value factors
Identifying areas of value conflict, setting priorities
Working out criteria towards decision
ICMR/ CPCSEA/ INSA Guidelines for human/ animal experimentation

Recommended reading

Francis C.M., Medical Ethics, I Edition, 1993, Jaypee Brothers, New Delhi p 189.
Good Clinical Practices: GOI Guidelines for clinical trials on Pharmaceutical Products in India (www.cdsco.nic.in)
INSA Guidelines for care and use of Animals in Research 2000. CPCSEA Guidelines 2001 (www.cpcsea.org)
Ethical Guidelines for Biomedical Research on Human Subjects, 2000, ICMR, New Delhi.
ICMR Guidelines on animal use 2001, ICMR, New Delhi.