

**5TH
SEMESTER**

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
(4 YEARS COURSE)**

LOW VISION AIDS & VISUAL REHABILITATION

Subject Code: BOPTS1-501

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives: The purpose of low vision assistance and rehabilitation is to enable individuals to perform the sight-based activities they want to do but currently cannot, using special methods and/or equipment

Course Outcomes: The purpose of the Vision Rehabilitation service is to help these individuals make the most of their limited vision. To accomplish this, state-of-the-art devices will be employed to improve the quality of life of individuals who have experience a loss of vision.

Unit:1. (16 hrs)

- Definition-old, new, proposed
- Grades of low vision
- Terminology of Low Vision
- Statistics/ Epidemiology – Relation between disorder, impairment & handicapped
- **Low vision optics:** Magnification-relative distance/ relative size/ approach/angular. Optics of Galilian & Keplarian telescope- advantage/disadvantage, significance of exit & entrance pupil.

Unit: 2. (14 hrs)

Low vision optics:

- Optics of spectacle magnifier/ determination/ calculation/ disadvantage/advantage.
- Optics of stand magnifier, significance of equivalent viewing distance & calculations.
- Telescope- distance/ near/ telemicroscope/ monocular/ binocular/ bioptic.
- Determination of decentration of lenses /prism/calculation/Lebenson's formula/simple diotric formula.
- Hand held magnifier-illuminated/ non-illuminated.
- Spectacle magnifier / half eye/ prism correction/ bar magnifier/ CCTV/ magni-cam/ low vision imaging system or V-max / contact lens & IOL telescope.

Unit: 3. (14 hrs)

Low vision examination:

- Task/ Goal oriented history-medical/ visual/ psychological history/ task analysis/ mobility / distance vision/ near vision / daily living/ illumination/ work & school.
- Visual acuity measurement-distance/ near/ use of log MAR chart (distance & near)/ light house, picture chart/ visual field/ Amsler chart/ contrast sensitivity/ overview of glare testing.
- Low vision refraction. – Assessment & prescription of low vision devices-optical/ non-optical/ rehabilitation services.
- Non- optical devices-pen/umbrella/ boldline note book/ illumination/ letter writer/ environmental modification/ signature guide/ needle threader/ eccentric viewing strategies.

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Unit: 4. (16 hrs)

- **Overview of Rehabilitation Services:** Definition/ implementation/ vocational guidance/ educational guidance/ mobility & orientation training / special teacher/ special school/ Braille system/ integrated system/referral center- activity/ support/ loan.
- **Overview of systematic / retinal diseases in relation to low vision:** Acromatopsia/ LMBB syndrome/ labers congenital anomaly/ down syndrome/ retinitis pigmentosa/ diabetic retinopathy/ optic atrophy/ albinism/ aniridia. – Counseling of low vision patient/ parents/ guardians/relatives.

Reference books-

- C.Dickinson : Principles and Practice of Low Vision, Butterworth- Heinemann Publication, 1998

CONTACT LENS-I

Subject Code: BOPTS1-502

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives: Contact lenses are medical devices worn directly on the cornea of the eye. Like eyeglasses, contact lenses help to correct refractive errors and perform this function by adding or subtracting focusing power to the eye's cornea and lens.

Course Outcomes: Objective and subjective evaluation of the performance of medical contact lenses fitted using a contact lens selection algorithm.

Unit:1. (16 hrs)

- Contact lens history & development.
- Benefits of contact lens over spectacle.
- Manufacturing methods-spin cast, Lethe cut, Cast modeling.
- Measurement of Contact lens
- Contact lens optics-Contact lens & spectacle lens. Back vertex calculation. Contact lens & Tear lens system

Unit: 2. (14 hrs)

- Classification of contact lens & its material (soft & RGP); Material property.
- Contact lens terminology. RGP & soft lens design. FDA classification of contact lens material.
- Patient selection & prescreening. Indications & contra indications of contact lens

Unit: 3. (14 hrs)

- Fitting & Assessment of soft contact lens & RGP.
- Care & maintenance of Soft contact lens and RGP.
- Writing contact lens prescription and order.

Unit: 4. (16 hrs)

- Modification of finished RGP lens.
- Checking the parameters

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- Slit lamp Examination technique – Corneal topography- Keratometry & Extended Keratometry

Reference books-

- Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA
- Ruben M Guillon: Contact lens practice, 994, 1st Edition

CLINICAL REFRACTION II

Subject Code: BOPTS1-503

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives: It is a clinical examination used by orthoptists, optometrists and ophthalmologists to determine a patient's need for refractive correction, in the form of glasses or contact lenses.

Course Outcomes: The goal of the subjective refraction is to achieve clear and comfortable binocular vision. The clinician's ability to maintain control during the refraction is directly related to their ability to communicate clearly with the patient.

Unit:1. (16 hrs)

- Assessment of children Vision & Paediatric evaluation, diagnosis & management.
- Aniblyopia.
- Neuro- Optometric Rehabilitation.
- Evaluation, Diagnosis & Optometric management of special children
- Visual Disorders in senior citizens, evaluation, diagnosis & management

Unit: 2. (14 hrs)

- Sports vision.
- Refraction in special cases
- Behavioral optometry
- Nystagmus and its optometric management.

Unit: 3. (14 hrs)

Geriatric Optometry:

- Optical and refractive changes in eye – Aphakia, Pseudo aphakia – its correction – Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye.
- Special considerations in ophthalmic dispensing to the elderly
- Management of visual problems of aging
- How to carry on one's visual task overcoming the problems of aging

Unit: 4. (16 hrs)

PEDIATRIC OPTOMETRY

- **Measurement of refractive status:** Determining binocular status, Determining sensory motor adaptability

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- **Post-Examination process:** Compensatory treatment and remedial therapy for: Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia – Remedial and compensatory treatment for strabismus and nystagmus – Vergence and accommodation.

Reference books-

- T Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, USA, 2007.
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007

OCULAR DISEASE II (POSTERIOR & NEURO-EYE DISEASE)

Subject Code: BOPTS1-504

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives: To impart an understanding of the path physiological processes underlying ocular disease. By better understanding these processes, participants can better recognize disease states and identify progression of disease.

Course Outcomes: Able to learn Etiology of posterior segment ocular diseases, Epidemiology of ocular conditions, Symptoms, signs & management of ocular conditions

Unit:1.

(15 hrs)

- Diseases of the Vitreous Humor- Congenital Anomalies. Vitreous Opacities.
- Hereditary Vitreo – Retinal Degeneration's. Vitreous Haemorrhage
- Detachment of Vitreous Humor.
- Vitreous Surgery
- Methods of clinically assessing the posterior segment (direct & indirect ophthalmoscopy)

Unit: 2.

(20 hrs)

- Disease of the Retina- Congenital & Dev. Defects.
- Inflammation of the Retina(Retinitis)
- Retinal Vasculitis, Oedema of the Retina, Haemorrhage of the Retina.
- Vascular Occlusio, Retinal Arteriosclerosis, Retinopathies, Retinal Telangiectasis.
- Degeneration's of the Retina. Detachment of the Retina. Surgical Procedures for Retinal Detachment .Tumours of the Retina. Phakomatoses, Injuries of the Retina.
- Disease of the Optic Nerve- Congenital Anomalies.
- Papilloedema. Inflammation of the Optic Nerve(Optic Neuritis).
- Ischaemic Optic Neuropathy . Optic Atrophy. Tumours of the Optic Nerve. Injuries of the Optic Nerve.

Unit: 3.

(15 hrs)

PUPILLARY REACTION

- Abnormal pupillary reactions
- Afferent pupillary conduction defects
- Argyll robertson pupils
- Differential dignosis of light-near dissociation

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- Adie pupil

Unit: 4. (10 hrs)

- Visual Pathway defects Migraine
- Myotonic dystrophy & blepharospasm
- NEUROFIBROMATOSIS- types and feature

Reference books-

- Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2nd Ed., 1989

PUBLIC HEALTH & COMMUNITY OPTOMETRY

Subject Code: BOPTS1-505

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives: Public Health Optometry is a hybrid discipline that combines the principles of public health and optometry where an optometrist applies the principles of both the specialties to reach out to the communities to provide care, promote eye health and train community level eye care workers.

Course Outcomes: A public health optometrist can lead in many roles that include teaching grassroots level community eye care personnel, epidemiologic and operations research on various issues related to refractive errors, spectacles use and coverage and also evaluate rural eye care programs

Unit:1. (15 hrs)

- Concept of public health.
- Principles of primary, secondary and tertiary care.
- Planning of health services.

Unit: 2. (20 hrs)

- Health Policies
- Role of Optometrist in managing eye camps
- NPCB and refractive blindness – optometrist’s role as primary health care provides.
- Health cares insurance including role of TPA.

Unit: 3. (15 hrs)

Ocular emergencies

- Foreign body
- Eye Pain
- Watering
- Injuries-perforating, non perforating & chemical

Unit: 4. (10 hrs)

- Role of International organization and NGOs in eye care

Reference books

- Oxford Text Book of Public Health & Preventive Medicine, (Vol I to I)

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
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LOW VISION AIDS & VISUAL REHABILITATION -PRACTICAL

Subject Code: BOPTS1-506

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Objective: The purpose of low vision assistance and rehabilitation is to enable individuals to perform the sight-based activities they want to do but currently cannot, using special methods and/or equipment

Experiments:

- Refraction, special charts. I Radical retinoscopy
- Evaluating near vision: Amsler grid and field defects, prismatic scanning
- Demonstrating aids – optical, Non-optical, Electronic
- Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near
- Spectacle mounted telescopes and microscopes
- Choice of tests, aids in different pathological conditions
- Contact lens combined system
- Rehabilitation of the Visually handicapped

CONTACT LENS-I - PRACTICAL

Subject Code: BOPTS1-507

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Objectives: Contact lenses are medical devices worn directly on the cornea of the eye. Like eyeglasses, contact lenses help to correct refractive errors and perform this function by adding or subtracting focusing power to the eye's cornea and lens

Experiments

- Contact Lens fitting
- Counseling to Contact Lens patient
- Post-fitting instructions
- Remedy of post-fitting problems
- Cosmetic Contact lenses
- Toric Contact lenses
- Bifocal contact lenses
- Continuous wear and extended wear lenses
- Therapeutic lenses / bandage lenses
- Contact lens following ocular surgeries

CLINICAL REFRACTION II -PRACTICAL

Subject Code: BOPTS1-508

**L T P C
0 0 2 1**

Duration: 2Hrs./Week

Objectives: It is a clinical examination used by orthoptists, optometrists and ophthalmologists to determine a patient's need for refractive correction, in the form of glasses or contact lenses.

Experiments

- Refraction and prescription of glasses

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**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
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SYSTEMIC CONDITION & THE EYE

Subject Code: BOPTS1-601

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives: To improve understanding of the relevance of general health and systemic medications on ocular health and the importance of a full history and symptoms

Course Outcomes: To improve understanding of how to explain to an older patient the importance of systemic disease and its impact on eye health.

Unit:1. (15 hrs)

- Arterial Hypertension: Pathophysiology, classification, clinical examination, diagnosis, complications, management. Hypertension and the eye.
- Diabetes mellitus: Pathophysiology, classification, clinical features, diagnosis, complications, management. Diabetes mellitus and the eye

Unit: 2. (20 hrs)

- **Malignancy:** Definitions, nomenclature, characteristics of benign & malignant neoplasms.
- Grading and staging of cancer, diagnosis, principles of treatment. Neoplasia and the eye.
- Vitamin deficiency and the eye
- **Acquired Heart Disease:** Embolism, Rheumatic heart disease, Sub acute bacterial endocarditic. Heart disease & the eye.
- **Connective Tissue Disease:** Anatomy and pathophysiology: Arthritis, Eye and connective tissue disease.

Unit: 3. (15 hrs)

- **Thyroid Disease:** Anatomy and physiology of the thyroid gland, Classification of thyroid disease Diagnosis, complications, clinical features, management of thyroid disease involving eye.
- Genetic disorders and the eye.
- Phacomatoses & the eye.

Unit: 4. (10 hrs)

- Tuberculosis: Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye.
- Tropical Disease and the Eye i) Leprosy. ii) Syphilis.

Reference books-

- Jerome Rosner: Pediatric Optometry, Butterworths, London, 1982
- Hirsch M J & Wick R E: Vision of the Aging Patient, An Optometric Symposium, 1960

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
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APPLIED OPTOMETRY & ORTHOPTICS

Subject Code: BOPTS1-602

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives: They examine, diagnose, treat and manage diseases and disorders of the eye. In addition to providing eye and vision care, they play a major role in an individual's overall health and well-being by detecting systemic diseases

Course Outcomes: An orthoptist has the responsibility of seeing how the eyes work together and interact with the brain to create vision, whereas optometrists are more focused on the examination of the eye itself

Unit:1. (15 hrs)

- **ORTHOPTIC INSTRUMENTS** :Prism Bar, Synoptophore, Maddox Wing, Maddox Rod, Red Green Goggles, Hess Screen & Risley Prisms

Unit: 2. (20 hrs)

Investigative procedures

- **Motor signs in squint** Head position: Face turn, chin position, Head tilt. Cover test & cover-uncover tests C) Maddox wing to assess heterophoria.
- **Assessment of degree of squint** Hirschbag test, Prism bar test, Krimsky test & Synoptophore test

Unit: 3. (15 hrs)

- **Various Cranial nerve palsy** – 3rd, 4th and 6th,
- **Assessment of ocular motility status** a) Hess chart b) Diplopia testing c) Bielschowskys Head tilting test
- **Assessment of visual sensory status in squint.** Amblyopia Suppression Binocular single vision – SMP, Fusion, Stereopsis.
- **Mechanisms leading to squint Types of squint** – a) latent / manifest b) horizontal / vertical c) paralytic / concomitant

Unit: 4. (10 hrs)

- **Orthoptic Treatment Procedures Management of** : Convergence insufficiency Amblyopia Suppression ARC Use of prism - For Exercise & correction Management of AMBLYOPIA

Reference books-

- M.Jalie: Principles of Ophthalmic Lenses, Edition 3, 1980
- T E Fannin & T Grosvenor: Clinical Optics,1996

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
(4 YEARS COURSE)**

CONTACT LENS-II

Subject Code: BOPTS1-603

**L T P C
3 1 0 4**

Duration: 60 (Hrs.)

Course Objectives: Contact lenses are medical devices worn directly on the cornea of the eye. Like eyeglasses, contact lenses help to correct refractive errors and perform this function by adding or subtracting focusing power to the eye's cornea and lens

Course Outcomes: : Objective and subjective evaluation of the performance of medical contact lenses fitted using a contact lens selection algorithm

Unit:1.

(15 hrs)

- Contact lens fitting in astigmatism.
- Contact lens fitting in keratokonus.
- Contact lens fitting in children.
- RGP lenses
- low D.K. and high D.K. lenses.
- Instructions regarding handling and care of lenses.

Unit: 2.

(20 hrs)

- Cosmetic and prosthetic contact lenses.
- Extended wear lenses versus Daily wear
- Disposable lenses
- Contact lens – Toric, Bifocal, Multifocal.
- Therapeutic lenses / Bandage lenses.

Unit: 3.

(15 hrs)

- Contact lens solutions – principle of action, compositions – Ordering contact lenses – writing prescription to the lab
- Contact lens – modifications of finished lenses (RGP). – Checking the parameters.

Unit: 4.

(10 hrs)

- Recent advances in contact lenses. – Follow up examinations
- Contact lens complications and their management.
- Prosthetic eye fitting procedures & conformers

Reference books-

- Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA
- Ruben M Guillon: Contact lens practice, 994, 1st Edition

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
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PROFESSIONAL PRACTICE MANAGEMENT

Subject Code: BOPTS1-604

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives: Its purpose is to provide health. It will also act as stimulus for creating greater uniformity in Management and dispensing of ophthalmic lenses, ophthalmic frames.

Course Outcomes: The ethical obligations of optometry toward patients are similar to those of other health professionals. These obligations generally require optometrists to recognize, respect, and protect the rights of their patients. This approach encourages patients to participate actively in their care and allows them to develop a relationship with their optometrist based on trust.

Unit:1. (15 hrs)

- Law & Optometry Laws governing medical and paramedical professions, Consumer act with respect to optometry and dispensing of optical Aids.
- International optometry.
- Personal and professional insurance (indemnity).
- Ethics.
- Negligence.

Unit: 2. (20 hrs)

- Basic Accountancy Introduction.
- Terms used in accounts, Principles of accountancy, Journal & ledger Trial Balance

Unit: 3. (15 hrs)

- **Public relations.** Definitions, PR- its disfunction from publicity, propaganda & advertising.
- Internal and external aspects of PR
- Phases of PR: analysis building, promotion of product or services, better employee, government and community relation

Unit: 4. (10 hrs)

- Case Study:- (at least ten Cases) as per format

Reference books-

- Oxford Text Book of Public Health & Preventive Medicine, (Vol I to I)

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
(4 YEARS COURSE)**

FUNDAMENTALS OF CLINICAL RESEARCH METHODS

Subject Code: BOPTS1-605

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives: Clinical trials are research studies that aim to determine whether a medical strategy, treatment, or device is safe for use or consumption by humans. These studies may also assess how effective a medical approach is for specific conditions or groups of people

Course Outcomes: The clinical research is to establish the effect of an intervention. Treatment effects are efficiently isolated by controlling for bias and confounding and by minimizing variation

Unit:1. (15 hrs)

- Introduction to research
- Types of research
- Terminology Steps involved in preparation of projects

Unit: 2. (20 hrs)

Research ethics

- Introduction about Biostatistics, variables, data, population sample, parameter statistics, scales of measurement. Classification & Presentation of data: Frequency distribution, Frequency polygon, Bar diagram, Histogram, Frequency distribution curve.
- Descriptive statistics: Statistics of location, Mean Median Mode, Geometric mean, Range, Statistics of Dispersion, Mean Deviation, Standard Deviation, Coefficient of Variation. Correlation & Regression

Unit: 3. (15 hrs)

- Sampling Statistics: Sampling & Sampling Distribution, Sampling Errors & sampling statistics, Standard errors, Degree of freedom, Types of Sampling.
- Probability Distribution: Classical definition, Conditional probability, Probability in continuous, Joint distribution of random variables

Unit: 4. (10 hrs)

- Experimental Design: Controlled and uncontrolled experiment, Sampling types, Sample size & pilot experiment, Single factor experiment & Factorial experiment-example, T-test.
- Applications: Collection, presentation and analysis of hospital statistical data with examples. Collection, presentation and analysis of Optometric and ophthalmologic data with a few examples.
- Case study

Reference books-

1. Pharmaceutical and Biomedical Project Management in a Changing Global Environment”, edited by Scott D. Babler
2. “Designing Clinical Research”, by Dr. Stephen B Hulley, MD, MPH, Steven R Cummings, MD, Warren S Browner, MD

**MRSPTU B. SC. (OPTOMETRY) SYLLABUS BATCH 2020 ONWARDS
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CONTACT LENS-II -PRACTICAL

Subject Code: BOPTS1-606

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Objectives: Contact lenses are medical devices worn directly on the cornea of the eye. Like eyeglasses, contact lenses help to correct refractive errors and perform this function by adding or subtracting focusing power to the eye's cornea and lens

Experiments

- Disposable contact lenses, Frequent replacement and lenses
- Use of Specular Microscopy and Tachymetry in CL
- Care of contact lenses, Contact lens solutions
- Complications of Contact lenses
- Contact lens modification of finished lenses
- Instrumentation in contact lens practice
- Checking finished lens parameters
- Contact lens – Special purposes – Swimming, Sports

APPLIED OPTOMETRY & ORTHOPTICS –PRACTICAL

Subject Code: BOPTS1-607

**L T P C
0 0 4 2**

Duration: 4Hrs./Week

Objectives: They examine, diagnose, treat and manage diseases and disorders of the eye. In addition to providing eye and vision care, they play a major role in an individual's overall health and well-being by detecting systemic diseases

Experiments

- Simple and compound microscope – oil immersion eyepiece
- Refractive instruments: Test chart standards Trial case lenses – best forms Refractor (phoropter) head units –Auto refractors Retinoscope – types available Nerve fiber analyzer
- Ophthalmoscopes and related devices Design of ophthalmoscopes – illumination/viewing Ophthalmoscope disc Filters for ophthalmoscopy Indirect ophthalmoscopes The use of the ophthalmoscope in special cases.
- Electrodiagnostics
- Manifest squint work-up
- Paralytic squint work-up
- Pleoptics
- Orthoptic Exercises