

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

Semester 3rd		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-301	Visual Optics	3	1	0	40	60	100	4
BOPTS1-302	Binocular Vision & Ocular Motility	3	1	0	40	60	100	4
BOPTS1-303	Medical pathology & Microbiology (General & Ocular)	3	1	0	40	60	100	4
BOPTS1-304	Biostatistics & Computer Application	1	1	0	40	60	100	2
BOPTS1-305	Pharmacology	3	1	0	40	60	100	4
BOPTS1-306	Optical & Ophthalmic Instrumentation -Practical	0	0	4	60	40	100	2
BOPTS1-307	Microbiology & Pathology-Practical	0	0	2	60	40	100	1
Total		-	-	-	320	380	700	21

Semester 4th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-401	Introduction to Vision Science	3	1	0	40	60	100	4
BOPTS1-402	Ocular Disease I (Anterior Segment Disease)	3	1	0	40	60	100	4
BOPTS1-403	Clinical Refraction I	3	1	0	40	60	100	4
BOPTS1-404	Ophthalmic Lens & Dispensing Optics	3	1	0	40	60	100	4
BOPTS1-405	Ophthalmic Instrumentation & Procedure -II	3	1	0	40	60	100	4
BOPTS1-406	Clinical Refraction I Practical	0	0	4	60	40	100	2
BOPTS1-407	Ophthalmic Lens & Dispensing Optics Practical	0	0	4	60	40	100	2
Total		-	-	-	320	380	700	24

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Semester 5th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-501	Low Vision Aids & Visual Rehabilitation	3	1	0	40	60	100	4
BOPTS1-502	Contact Lens-I	3	1	0	40	60	100	4
BOPTS1-503	Clinical Refraction II	3	1	0	40	60	100	4
BOPTS1-504	Ocular Disease II (Posterior & Neuro-eye Disease)	3	1	0	40	60	100	4
BOPTS1-505	Public Health & Community Optometry	3	1	0	40	60	100	4
BOPTS1-506	Low Vision Aids & Visual Rehabilitation Practical	0	0	4	60	40	100	2
BOPTS1-507	Contact Lens-I - Practical	0	0	4	60	40	100	2
BOPTS1-508	Clinical Refraction II - Practical	0	0	2	60	40	100	1
Total		-	-	-	380	420	800	25

Semester 6th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-601	Systemic Condition & the eye	3	1	0	40	60	100	4
BOPTS1-602	Applied Optometry & Orthoptics	3	1	0	40	60	100	4
BOPTS1-603	Contact Lens-II	3	1	0	40	60	100	4
BOPTS1-604	Professional Practice Management	3	1	0	40	60	100	4
BOPTS1-605	Fundamentals of Clinical Research methods	3	1	0	40	60	100	4
BOPTS1-606	Contact Lens-II - Practical	0	0	4	60	40	100	2
BOPTS1-607	Applied Optometry & Orthoptics - Practical	0	0	4	60	40	100	2
Total		-	-	-	320	380	700	24

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Semester 7th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
BOPTS1-701	Project	0	0	32	-	700	700	16
Total							700	16

The candidates will be supervised by the concerned faculty & the project report will be submitted following competitions. The Viva-Voce examination shall be conducted by external expert.

Semester 8th		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name	L	T	P	Int.	Ext.		
	Internship	0	0	32	-	700	700	16
Total							700	16

The candidate shall undergo internship of Six months in optometry department. The internship report shall be submitted to the principal & Viva-Voce examination shall be conducted by external expert.

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Overall Marks / Credits

Semester	Marks	Credits
1 st	700	22
2 nd	700	23
3 rd	700	21
4 th	700	24
5 th	800	25
6 th	700	24
7 th	700	16
8 th	700	16
Total	5700	171

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VISUAL OPTICS

Subject Code: BOPTS1-301

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives:

- The aim is to achieve knowledge of the fundamentals of physical optics and how they apply to the human eye

Course Outcomes:

- The Professional Certificate in Low Vision. The professional, an understanding of the terminology used to describe low vision and visual and train in the use of electronic and optical low vision task appropriate devices

Unit:1. (16 hrs)

- **Review Of Geometric Optics** : Vergence and power – Conjugacy, Object space and image space – Sign convention – Spherical Mirror, catoptric power – Cardinal points – Magnification
- **Optics of Ocular Structures**: Cornea and aqueous, Crystalline lens, Vitreous – Schematic and reduced eye – Corneal curvature and thickness – Keratometry – Curvature of the lens and ophthalmophakometry – Axial and axis of the eye

Unit: 2. (14 hrs)

- **Refractive Anomalies and Their Causes** : etiology of refractive anomalies – Contributing variabilities and their ranges – Populating distributions and their ranges – Optical component measurement – Growth of eye in relation to refractive errors – Emmetropia, Myopia, Hyperopia – Astigmatism – Anisometropia And Aniseikonia – Presbyopia, Aphakia and pseudophakia – Correction and management of Amblyopia.

Unit: 3. (16 hrs)

- **Far and Points of Accommodation and Vertex Distance** : Correction of spherical Ametropia – Axial versus refractive ametropia – Relationship between Accommodation and convergence, A/C Ratio – 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.

Unit: 4. (14 hrs)

- **Retinoscopy Principles and Methods**– Retinoscopy-speed of reflex and optimum condition – Retinoscopy-Dynamic and Static – Review of objective refractive method – Cross cylinder method for astigmatism, astigmatic fan test – Difficulties in objective tests and their avoidance – Transposition of lenses – Spherical equivalent

Reference books-

1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998

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

BINOCULAR VISION & OCULAR MOTILITY

Subject Code: BOPTS1-302

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives:

- Be able to develop skills to carry out the optometric investigations. Be able to assess disorder of ocular motility uniocular, binocular visual functions.

Course Outcomes:

- Be able to do refraction work including prescription of glasses, contact lenses and low vision devices.

Unit:1.

(16 hrs)

- Grades of Binocular Vision – Simultaneous perception (first grade of binocular vision), fusion, stereopsis (third grade of binocular vision).
- Advantages of binocular vision. Visual direction and the horopter-visual direction, corresponding point and normal retinal correspondence, horopter, physiologic diplopia. Binocular fusion-panum's area, fixation disparity, theories of binocular fusion, synergy hypothesis of panum, local sign hypothesis of hering, eye movement hypothesis of helmholts, suppression hypothesis of du tour and verhoeff, physiologic basis of fusion.

Unit: 2.

(14 hrs)

- Depth with fusion and depth with diplopia, diplopia without depth, retinal rivalry and suppression, binocular rivalry. Stereopsis-physiological basis of stereopsis, local and global stereopsis and fusion, stereopsis acuity neurophysiology of stereopsis. Depth perception stereopsis, nonstereoscopic clues to the perception of depth under binocular condition, monocular clues (non stereoscopic clues to spatial orientation)-parallactic movements, linear perspective overlay of contours, size distance from horizon, distribution of highlights, shadow, shades and light. aerial perspective, influence of accommodation and convergence on depth perception, conclusion. Integration of the motor and sensory system into binocular vision.

Unit: 3.

(16 hrs)

- Binocular optical defects-anisometropia-vision in anisometropia, treatment, Binocular optical defects-aniseikonia symptoms, clinical investigation, treatment. Binocular muscular coordination orthophoria-binocular vision. Binocular muscular anomalies-heterophoria-the

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causes of imbalance, exophoria, esophoria, hyperphoria, cyclophoria, symptoms of heterophoria, treatment. Binocular muscular anomalies-heterotropia—the vision in concomitant strabismus, treatment. Binocular muscular co-ordination-convergence-voluntary and reflex convergence, reflex convergence, the measurement of convergence, the relation between accommodation and convergence, binocular accommodation, fatigue of convergence. Binocular muscular anomalies anomalies of convergence and other reading difficulties—insufficiency of convergence, convergence excess, the ophthalmologist and the reading ability of children

Unit: 4.

(14 hrs)

- Test for simultaneous macular perception, test for fusion, test for stereopsis-synoptophore or stereoscope test, vectograph test, titmus stereo test, randomdot stereogram test, simple motor task test based on stereopsis. – Eye movements: the orbit anatomy of the extraocular muscles. Interactive dynamics of orbital mechanisms & brain stem neurophysiology – outline of extra ocular muscle control. Extra ocular muscles-their function & nerve supply. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. – Ocular movements - Monocular Movements (Adduction, Abduction, supraduction, Infraduction, Incycloduction, excycloduction). Binocular Movements –VERSIONS- (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). VERGENCES – (Convergence, divergence, vertical vergence), Supra nuclear control of eye movements.(the superior colliculi, the occipital cortex, the psycho optical reflexes & fixation. – Oculomotor system: vestibular – ocular reflexes, optokinetic reflexes. Diagnosis & clinical aspects of ocular anomalies & disorders. Converge through a spectacle lens. Prismatic effects in spectacle lenses.

Reference books-

- Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
- Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
- Gunter K. V. Mosby Company
- Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

MEDICAL PATHOLOGY & MICROBIOLOGY (GENERAL & OCULAR)

Subject Code: BOPTS1-303

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- The aim of Medical Microbiology course is to introduce basic principles and application relevance of clinical disease for students who are in preparation for physicians. The content of rigorous course includes many etiological agents responsible for global infectious diseases

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Course Outcomes:

- Pathology & Microbiology is the study of the causes and effects of disease or injury. The word pathology also refers to the study of disease in general, incorporating a wide range of biology research fields and medical practices

Unit:1. (16 hrs)

- **Ocular Pathology:** Blood sample collection and preservation. Routine Haematological examinations: Hb, BT, CT, TLC, DLC and ESR.
- **Peripheral Blood Film (PBF)-** staining & its significance. Urine sample collection methods, Physical, Chemical & Microscopic examination, Grossing of tissue., Tissue processing.
- **Fixation of tissue, Section cutting, Staining:** Haematoxylin, Eosin & Special stains.

Unit: 2. (14 hrs)

- **Ocular Microbiology:** Introduction to Microbiology & classification, Normal flora of eye., Sterilization /Aseptic techniques, Culture media for Bacteria, fungi & Virus, Bacteria: Gram positive & negative.

Unit: 3. (16 hrs)

- **Ocular Microbiology:** Fungi: Saprophytic and Pathogenic, Virus, Chlamydia & parasites, Microbial diseases of the eye, Staining procedures: Gram & KOH.

Unit: 4. (14 hrs)

- **Ocular Bio-chemistry:** Introduction to basic Biochemistry (carbohydrates, lipids, proteins and vitamins), Tear film. Metabolism of cornea and lens, Aqueous & Vitreous, Rhodopsin cycle.

Reference books-

- K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997
- Corton kumar and robins: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.
- S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

BIOSTATISTICS & COMPUTER APPLICATION

Subject Code: BOPTS1-304

L T P C

Duration: 30 (Hrs.)

1 1 0 2

Course Objectives: Defining the type and quantity of data need to be collected. Organizing and summarizing the data. Analyzing the data and drawing conclusions from it. Assessing the strengths of the conclusions and evaluating their uncertainty

Course Outcomes: In this course we'll learn how to effectively collect data, describe data, and use data to make inferences and conclusions about real world.

Unit -1. (10 hours)

- Definition & Calculations of mean (by both direct and shortcut method and step deviation method) mode and Median (individual observation, discrete observation and continuous observation.
- Probability

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Unit-2.

(10 hours)

- Tabulation of Data Graphical Presentation of Frequency Distribution :Line frequency, Histogram(for equal and unequal class interval, inclusive data and for Midvale)
- Frequency polygon
- Frequency curve
- Cumulative frequency curve

Unit-3.

(10 Hours)

- **Computer** : Input/ output, memory, data representation and number system, software, Abbreviation related to computer

Reference books-

- Sinha P.K., Computer Fundamentals, BPB Publishing. 2. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing. 3. Leon A. & Leon M., Introductions to Computers, Vikas Publications
- Peter Norton_s, Introductions to Computers, Tata McGraw Hill.
- Price Michael, Office in Easy Steps, TMH Publication

PHARMACOLOGY

Subject Code: BOPTS1-305

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives:

- The goal of the study of pharmacological sciences is to understand the properties of drugs and the ways in which these properties react, according to The American Society for Pharmacology and Experimental Therapeutics.

Course Outcomes:

- Pharmacology is the study of how a drug works on the body, its side effects on the body, and the way the body uses the drug.

Unit:1.

(16 hrs)

- Ocular Pharmacology: an introduction.
- Autonomic nervous system.
- Routes of drug administration.
- Miotics, Mydriatics & Cycloplegics.

Unit: 2.

(14 hrs)

- Anti-bacterial drugs & therapy.
- Anti-fungal drugs & therapy.
- Anti-viral drugs & therapy.
- Anti-inflammatory drugs & therapy.

Unit: 3.

(16 hrs)

- Anti-glaucoma drugs & therapy.
- Ocular Preservatives.

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- Ocular Lubricants.
- Local Anaesthetics.

Unit: 4.

(14 hrs)

- Ocular dyes, Ocular Antiseptics & Disinfectants.
- Anti-Vascular Endothelial Growth Factor (Anti-VEGF) drugs.
- Contact lens solutions

Reference books-

- K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
- Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
- T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997
- CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004
- S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

OPTICAL & OPHTHALMIC INSTRUMENTATION -PRACTICAL

Subject Code: BOPTS1-306

L T P C
0 0 4 2

Duration: 4Hrs./Week

Objectives:

They are used in microscopes, binoculars, telescopes, cameras, slide projectors, CD players and many other optical instruments. A maintenance manual for ophthalmic instruments and equipment has been a long felt need. It may involve replacement of components of optical instrument purpose of this manual is to assist the person with the maintenance responsibilities.

Experiments: To study the operations of the following instruments:-

- Lensometer.
- Retinoscope.
- Standard Test Charts.
- Autorefractometer.
- Slit Lamp Examination.
- Keratometer.
- Ophthalmoscope

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MICROBIOLOGY & PATHOLOGY-PRACTICAL

Subject Code: BOPTS1-307

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

Duration: 2Hrs./Week

Course Objectives:

The aim of Medical Microbiology and pathology course is to introduce basic principles and application relevance of clinical disease for students who are in preparation for physicians. The content of rigorous course includes many etiological agents responsible for global infectious diseases

Experiments

- Cell injury – Fatty change, necrosis.
- Acute inflammation.
- Chronic inflammation.
- Circulatory disturbances.
- Pathology of Tuberculosis.
- Pathology of Leprosy and Syphilis.
- Neoplasia.
- Ocular tumors.
- Examination of urine.
- Examination of Peripheral smear.
- Anemia, Leukemia.
- Bleeding disorders.
- Ophthalmic wound healing
- Eyelid [normal and pathology including inflammations and tumours
- Cornea [Normal and pathology in degeneration and dystrophies]
- Lens [normal and pathology of cataract]
- Retina [normal and pathology in inflammatory diseases, infections]
- Intraocular tumours [Retinoblastoma and choroidal melanoma]
- Orbit [inflammation and neoplasia]
- Optic nerve [normal and tumours]
- Gram Staining of bacteria
- Slide Identification of nonvirulent bacteria's & pathogens.
- Preparation of common stains used in microbiology & pathology (Eosin Haematoxylin Leishmann Stain etc.)-(Demonstration).

**4TH
SEMESTER**

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INTRODUCTION TO VISION SCIENCE

Subject Code: BOPTS1-401

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Vision Sciences is the study of ocular, systemic and neurological disease, underpinned by foundations in biomedical, computation, statistical or societal expertise

Course Outcomes:

- This course will have an advanced knowledge and understanding of vision science, with experience investigating problems, critical thinking and analysing experimental data. This specialisation will provide students with a broad understanding of vision sciences and significant experience in a chosen area.

Unit:1.

(16 hrs)

- **Neurophysiology** Geniculate cortex: Structure of geniculate cortex., Electrophysiology , Projection – retinal projection ,Detail idea about visual cortex & function of visual cortex.
- **Higher visual pathways**(primary visual Pathway to cerebral center, Lateral Geniculate body, non-geniculate targets for retinofugal input, visual center).

Unit: 2.

(14 hrs)

- **Contrast Sensitivity** : Types (spatial & Temporal contrast sensitivity), Neural Mechanism, Measurement of contrast sensitivity (Arden gratings , Cambridge low contest gratings, Pelli – Robson chart)
- **Visual stimulus**, photometry and spectral sensitivity.

Unit: 3.

(16 hrs)

- **Visual perception** –Temporal and Spatial properties of visual function, Spatial analysis, Spatial vision, Spatial modulation thresholds, Double pathway to higher visual centers. Visual Discrimination, attention & cognition. Higher integrative activity, Binocular perception, stereoscopic depth perception.
- Motion perception, perceptual organization and visual illusion.

Unit: 4.

(14 hrs)

- **Electrodiagnostic tests:** ERG, EOG, VER 8. Visual psychophysics and its clinical application in measuring visual function
- Vision Changes with age and disease
- Newer developments in Vision science

Reference books-

- Goldstein E.B. Sensation & Perception
- Palmer S.E. : Vision Science: Photons To Phenomenology
- Bruce, Green & Georgeson : Visual Perception
- Sekuler R. & Blake R.: Perception
- Mather G.: Essentials Of Sensation And Perception
- Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998

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- Sarika G, Sailaja MVSE Vaithilingam: practice of Low vision –A guide book, Medical Research Foundation, 2015. REFERENCE BOOKS:
- Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
- Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
- A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

OCULAR DISEASE I (ANTERIOR SEGMENT DISEASE)

Subject Code: BOPTS1-402

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives: This course is for ophthalmologists and ophthalmologists in training cases that focuses on cataract, cornea and glaucoma cases.

Course Outcomes: For the allied and healthcare professionals. Towards health promotion and disease prevention, as well as assessment, management, external examination, anterior segment and posterior segment examination

Unit:1.

(14 hrs)

- **Anterior segment ocular diseases** : involving orbit, eyelids, adnexa, conjunctiva, cornea, urea, sclera, anterior chamber, iris and lens. Symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology , systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures.
- **Disease of the Lids** – Congenital Deformities of the Lids .Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids. Neoplasm's of the Lids. Injuries of the Lids

Unit: 2.

(16 hrs)

- **Diseases of the Lachrymal Apparatus-** Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis.
- **Disease of the Conjunctiva-** Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin- A Deficiency. Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation . Injuries of the Conjunctiva.
- **Disease of the Cornea** –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial , Viral , Fungal)

Unit: 3.

(16 hrs)

- **Disease of the Sclera-** Episcleritis. Scleritis. Staphyloma of the Sclera. Blue Sclerotic Scleromalacia Performs. Nanophthalmos. Injuries of the Sclera.

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- **Disease of the Iris.-** Congenital Anomalies. Inflammations (Anterior Uveitis) . Specific Types of Iridocyclitis . Degenerations of the Iris. Cysts and Tumours of the Iris. Injuries of the Iris.
- **Disease of the Celery Body-** Inflammations of the Celery Body. Purulent Iridocyclitis (Panophthalmitis) . Evisceration . Sympathetic Ophthalmia. Vogt- Koyanagi – Harada Syndrome. Tumours of the Celery body. Injuries of the Celery body.
- **Glaucoma-** .Formation of Aqueous Humor. Drainage of Aqueous. Intraocular Pressure(IOP) . Ocular Rigidity.

Unit: 4.

(14 hrs)

- **Tonography.** .Developmental Glaucoma (Buphthalmos) . Primary Narrow Angle Glaucoma. Primary Open Angle Glaucoma. Normotensive Glaucoma . Ocular Hypertension . Secondary Glaucoma. Surgical Procedures for Glaucoma(Steps Only) ,YOGPI ,trabeculectomy.Laser Procedure in Glaucoma . Artificial Drainage Devices in Glaucoma Surgery(Molteno).
- **Disease of the Lens-** Congenital Malformations. Cataract . Congenital and Developmental Cataract . Senile Cataract. Traumatic Cataract. Complicated Cataract. Secondary Cataract . After Cataract. Dislocation of the Lens. SurgicalProcedures for Removal of the Lens(Operative Steps Only). Phacoemulsification(ICCE,ECCE,IOL) . Small Incision Cataract Surgery (Manual Phaco).Intraocular Lens Implantation-AC+PC, IOL.

Reference books-

- Clinical ophthalmology- Jack j kanski
- Essentials of ophthalmology- samar kumar basak
- A k khurana: comprehensive ophthalmology, 4th edition, new age international (p) ltd. Publishers, new delhi, 2007
- Stephen j. Miller : parsons diseases of the eye, 18th edition, churchill livingstone, 1990
- Jack j. Kanski clinical ophthalmology: a systematic approach, 6th edition, butterworth - heinemann, 2007

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CLINICAL REFRACTION I

Subject Code: BOPTS1-403

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- Refractionist (also known as ophthalmic opticians) are medical professionals trained to prescribe to impart limited training to aid the Ophthalmologist to arrive at an accurate diagnosis to enable to main outcome measures.

Course Outcomes:

- The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result there after

Unit:1.

(16 hrs)

- **Ophthalmic Case Historian:** Demographic data, chief complaints, secondary complaints, ocular history, medical history, drugs and medications, family ocular history, family medical history, social history, review of system, few example of history writing.
- **Objective Refraction:** Streak Retinoscopy – all procedures to use streak retinoscope; static and dynamic retinoscopy, different methods of dynamic retinoscopy – MEM, Nott's, Sheard's, Low and high neutral, Bells, Cross, Taits. Other methods of retinoscopy-Radical, Near(Mahandra), Chromoretinoscopy, String Lensbar, use of objective and autorefractor.

Unit: 2.

(14 hrs)

- **Subjective Refraction:** Monocular Distance – Classic fogging, testing of astigmatism under fog fixed astigmatic dial (clock dial), rotary astigmatic dial, combination of fixed and rotary dial (Fan and Block test), J.C.C. Duochrome or Bichrome, Binocular balancing – alternate occlusion, prism dissociation, dissociated duochrome balance, Borish dissociated fogging, equalization
- **Binocular Distance** – T.I.B. (Turville Infinity Balance), Polarized – Target and polarized filter, fogging

Unit: 3.

(14 hrs)

- Near subjective refraction. Cycloplegic refraction, cycloidemia, sudden unfogging , Borish delayed spherical end point, pinhole estimation of refractive error, stenopaic slit refraction, measurement of vertex distance, distometer, use of subjective autorefractor. Different methods of measuring amplitude of accommodation.

Unit: 4.

(16 hrs)

- **Correction of Presbyopia** – Different methods of stimulation of tentative presbyopic addition – amplitude of accommodation, J.C.C., NRA-PRA balance, Bichrome, Plus Build-up, based on age, Dynamic retinoscopy. Occupational consideration, finalization of odd for near and intermediatedifferent options of correction. Measurement of IPD and significance. Final discussion with the patient. Writing prescription of power and counseling

Reference books-

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

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- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth Heinemann, 2007
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth Heinemann, 2007
- BORISH'S CLINICAL REFRACTION

OPHTHALMIC LENS & DISPENSING OPTICS

Subject Code: BOPTS1-404

L T P C
3 1 0 4

Duration: 60 (Hrs.)

Course Objectives:

- This course offer clinical advice regarding eye health and vision correction. Prescribe spectacles or contact lenses. You might also dispense, fit and supply spectacles or contact lenses

Course Outcomes:

- Optical dispensers interpret optical prescriptions and fit and service optical appliances such as spectacle frames and lenses. An optical dispenser works as part of an eye care team alongside optometrists

Unit:1.

(16 hrs)

- **Ophthalmic lens** : Characteristics of lenses: Introduction. Spherical lenses. Plano-cylindrical lenses. Sphero-cylindrical lenses. Designation of lens power. Power of lenses. Transposition. Base curve of spherical lens. Base curve of cylindrical single vision lens. Prism prescription and its application in dispensing.
- **Spectacle lenses**: Characteristics of lens materials. Specific gravity (weight). Refractive index. Abbe number. Impact resistance. Scratch resistance. Curve variation factor.
- **Current materials**: Crown glass. CR-39. High -index glass. High -index plastic. Poly carbonate. Photochromatic materials. trivex

Unit: 2.

(14 hrs)

- **Lens types**: Single vision lens. Bi-focal lenses. Tri-focal lenses. progressive lenses.
- **Ophthalmic lens coating**: Anti-reflecting coatings. Special notes concerning anti-reflecting coatings. Protective coating, color coating. Mirror coating.
- **Absorptive lenses**: Classification of lens tints. Chemical that produces color & assist in absorptive characteristics of glass lenses. Effect in prescription on lens color. Availability of tinted lenses

Unit: 3.

(14 hrs)

- **Impact Resistant lenses**: Types of impact resistant lenses. Plastic lenses. Impact resistant Dress-Eye wear lenses. Tempered glass lenses. Types of impact resistant lenses most beneficial of specific patients.

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- **Lens for special uses:** Fresnel lenses. Thinlite lenses. Lenticular Lenses. Aspheric lenses. Atoric Lens, Introduction to filter
- Fundamentals of Lens surfacing & quality.

Unit: 4.

(16 hrs)

- **Spectacle frame :** Types, Materials, Measurement & Selection
- **Lens Selection:** Ground rule for selection, Selection criteria
- Facial Measurement & Measuring heights
- Pediatric Dispensing & Management
- Verification of trouble shooting of Lens & Frames
- Occupational dispensing & its management

Reference books-

- IACLE modules 1 - 10
- CLAO Volumes 1, 2, 3
- Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
- Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
- E S. Bennett , V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008
- OPHTHALMIC ASSISTANT BY HAROLD A STEIN

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(4 YEARS COURSE)**

OPHTHALMIC INSTRUMENTATION & PROCEDURE- II

Subject Code: BOPTS1-405

L T P C

Duration: 60 (Hrs.)

3 1 0 4

Course Objectives:

- To train the students to assist the Eye care practitioners
- To acquire knowledge of certain techniques to carry out early detection of Visual defects.
- To train the student in Power checking, Ophthalmic Lens Grinding, Manufacturing Units etc.

Course Outcomes:

- The student is trained to get the knowledge of morphology of EYE, errors of refraction and common EYE Diseases. The student must know the knowledge of lenses, ophthalmic blanks, frames etc.
- To-train the student in fitting and checking of prescribed glasses according to power.
- To prepare the students to conduct vision survey in community.
- To make the student to participate in Health Education programmes for prevention of Eye diseases and early detections.

Unit:1.

(16 hrs)

- **Principles, clinical use (methods) & significance of instruments:** Tonometer – Principles, types, clinical importance as a routine procedure (application)
- **Pachometer** – Principles, types, clinical importance
- **Ultrasonography** – (A scan, B scan) – Principles and application. And basics of UBM

Unit: 2.

(14 hrs)

- **F.F.A** – Principles and demonstration of film.
- **PAM** – Principles and importance.
- **Perimeter** – Basics of perimetry – Humphray instruments, Automated perimetry – basics, types(names) , interpretation of normal Glaucoma Field of Definition.

Unit: 3.

(14 hrs)

- **LASER** – Introduction – Einstein co-efficient, population inversion. Different types of LASER (mention) – Excimer, Lasik Nd-yag, Argon, Diode, He-Ne gas LASER, Xenon. LASER safety, Ophthalmic LASER application(Argon, Yag)

Unit: 4.

(16 hrs)

- Basics of OCT
- Basics of Phoropter
- Basics of Topography

Reference books-

- Ophthalmic assistant by Harold A Stein
- Clinical ophthalmology- Jack J Kanski
- Jalie mo: ophthalmic lens and dispensing, 3rd edition, Butterworth –Heinemann, 2008
- Troy e. Fannin, Theodore Grosvenor: clinical optics, 2nd edition, Butterworth – Heinemann, 1996

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- C w brooks, im borish: system for ophthalmic dispensing, 3rd edition, butterworth - heinemann, 2007
- Michael p keating: geometric, physical & visual optics, 2nd edition, butterworth – heinemann, 2002

CLINICAL REFRACTION I -PRACTICAL

Subject Code: BOPTS1-406

L T P C
0 0 4 2

Duration: 4Hrs./Week

Objectives: This training is designed for para –ophthalmic professionals with an objective, To enhance their clinical skill in refraction

Experiments

- History writing
- Recording VA
- Practice of Streak Retinoscopy
- Direct Ophthalmoscopy-Normal Fundus
- Subjective refraction –1. fogging, clock dial, fan, JCC, prism balance, TIB, duochrome, cyclodeimia, Slit refraction
- Measurement of amplitude of accommodation. • Presbyopic add • Writing prescription.
- Examination of Extra Ocular Muscle balance
- Examination of Intra ocular pressure – Schiottz & Applanation
- Optic disc evaluation
- Examination of Lacrimal system
- Examination of orbit
- Assessment of accommodation & Convergence

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

OPHTHALMIC LENS & DISPENSING OPTICS -PRACTICAL

Subject Code: BOPTS1-407

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

Duration: 4Hrs./Week

Course Objectives:

- Optical dispensing is a subspecialty of optometry which includes all procedures from the time the glass prescription is presented to the optician till the patient receives the pair of glasses satisfactorily.

Course Outcomes:

- This course is to develop the optician's skills and knowledge for quality vision care services

Experiments

- Find out the menidean & optical center of ophthalmic lens
- Neutralization – manual & help of lensometer
- Identification of lens-spherical, cylindrical & spheno-cylindrical lenses
- Lens-surfacing & edging, cutting & marking of single vision bifocal progressive
- Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification
- Frame selection: Fashion, function & standard alignment
- Lens selection: Ground rule for selection, selection criteria.
- Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler. Common difficulties in measuring P.D , Measuring monocular P.D, measuring near C.D.
- Measuring heights: - single vision, bifocal, multifocal, progressive j) Pediatric dispensing