



NIMS UNIVERSITY

SYLLABUS

OF

BACHELOR OF OPTOMETRY & OPHTHALMIC
TECHNOLOGY – BOOT

VERSION 1.2

DIRECTORATE OF DISTANCE EDUCATION

Shobha Nagar, Jaipur-Delhi Highway (NH-11C), Jaipur- 303121
Rajasthan, India

BACHELOR OF OPTOMETRY & OPHTHALMIC TECHNOLOGY – BOOT

Eligibility	:	10+2 with PCB/PCM
Programme Duration	:	4 Years
Programme Objectives	:	The scope of Optometry includes the detection of common eye diseases, the management of binocular vision problems such as squints and lazy eyes and the prescription of spectacles and contact lenses. The Bachelor degree in Optometry is a programme that aims to produce professionally competent optometrists serving as primary eye care health practitioners. NIMS University is one of the few premium institutions in India that offers a Bachelor degree in Optometry and Ophthalmic Technology.
Job Prospects	:	After the completion of BOOT, you will find challenging career opportunities with Optician shops, eye doctors, and Contact Lens companies, Ophthalmic lens industry and hospital eye departments. A technician can work for eye testing, Contact lenses, squint exercises, etc. You can start your own eye clinic, Optical shop, lens manufacturing unit. You can also get job opportunities with Optician shops and hospitals in India and abroad. Common job profiles of students after completing BOOT include: Optometry Technicians, Ophthalmic Assistants and Ophthalmic Nurses.

YEAR I

Course Code	Course Title	Theory/ Practical	Continuous Assessment (Internals)	Credits
ENG14101	Communication For Professionals	70	30	5
ANT14101	Anatomy & Physiology	70	30	5
MBL14105	Basic Biochemistry, Pathology & Microbiology	70	30	6
OPH14101	Ocular Anatomy & Physiology	70	30	6
OPH14102	Ocular Pharmacology	70	30	6
ANT14101P	Anatomy & Physiology	35	15	1
MBL14105P	Basic Biochemistry, Pathology & Microbiology	35	15	1
OPH14101P	Ocular Anatomy & Physiology	35	15	1
TRN14101	Hospital Training-I	200		1
			TOTAL	32

YEAR II

Course Code	Course Title	Theory/ Practical	Continuous Assessment (Internals)	Credits
CSC14207	Fundamentals of Computer Science	70	30	5
OPT14201	Physical & Geometric Optics	70	30	5
OPH14201	Ocular Disease	70	30	6
OPH14202	Dispensing Optics	70	30	6
HHM14202	Hospital Procedure	70	30	6
OPT14201P	Physical & Geometric Optics	35	15	1
OPH14201P	Ocular Disease	35	15	1
OPH14202P	Dispensing Optics	35	15	1
TRN14201	Hospital Training-II	200		1
			TOTAL	32

YEAR III

Course Code	Course Title	Theory/ Practical	Continuous Assessment (Internals)	Credits
OPH14301	Visual Optics	70	30	5
OPH14302	Orthoptics	70	30	5
OPH14303	Optometric Instruments & Clinical examinations of Visual System	70	30	6
OPH14304	Contact Lens & Low Vision Aids	70	30	6
OPH14305	Public Health & Community Ophthalmology	70	30	6
OPH14301P	Visual Optics	35	15	1
OPH14303P	Optometric Instruments & Clinical examinations of Visual System	35	15	1
OPH14304P	Contact Lens & Low Vision Aids	35	15	1
TRN14301	Hospital Training-III	200		1
			TOTAL	32

YEAR IV

Course Code	Course Title	Theory/ Practical	Viva Voce	Credits
CST14401	Ophthalmic Case Studies	100	50	6
RPT14401	Optometry Reflective Report	100	50	6

DETAILED SYLLABUS

INSTRUCTIONAL METHOD: Personal contact programmes, Lectures (virtual and in-person), Assignments, Labs and Discussions, Learning projects, Industrial Training Programmes and Dissertation.

YEAR I

COMMUNICATION FOR PROFESSIONALS- ENG14101

UNIT	CONTENTS
1	<p>Parts of Speech: Definition of all the eight parts along with examples and their use in language.</p> <p>Definite and Indefinite articles: a, an, and, the, Definition and its uses along with examples.</p> <p>Types of Pronouns: Personal, Reflexive, Emphatic, Demonstrative, Relative, Indefinite, Interrogative and Distributive pronouns.</p> <p>Noun: Defining noun along with types and categories, Gender, Number case</p> <p>Adjective: Adjective, Comparison, Adjective used as nouns, Positions of the Adjective and Correct use of Adjectives.</p> <p>Verb: Definition, Its forms, Verbs of incomplete predication, Phrases (defining it along with examples). Adjective, Adverb and Noun Phrase.</p> <p>Clauses: Defining it along with examples: Adverb, Adjective and Noun Clauses.</p> <p>Sentence and its Types: Simple, Compound and Complex, Subject and Predicate (parts of a sentence), Transformation of Sentences. Active and Passive voice, Mood and Narration (Direct and Indirect speeches).</p>
2	<p>Words and Phrases: Word formation (prefix, suffix), Idioms, Synonyms and Antonyms, Phonetics, Speech sound, The phoneme, The syllable and IPA transcription.</p>
3	<p>Business Correspondence I: Paragraph writing, Introductory remarks, Principles, Writing of single paragraphs and precise writing Letter writing Quotations and Orders- Orders and tenders, Inviting and sending quotations, Placing orders and Inviting tenders.</p>
4	<p>Business Correspondence II: Notices, Agenda and Minutes, Application letter, Importance and function, Drafting the application, Elements structure, Preparing CV's.</p>
5	<p>Applied Grammar: Correct usage of Grammar, Structure of sentences, Structure of paragraphs, Enlargements of</p>

	vocabulary.
6	Business Writing: Written composition, Precise writing and summarizing, Writing of Bibliography, and Enlargement of vocabulary.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. English Grammar and Composition Wren and Martin. S. Chand & Company Ltd.
- B. Intermediate English Grammar; Raymond Murphy Pub: Foundation Books, New Delhi
- C. Eng. Grammar usage and Composition; Tickoo & Subramanian Pub: S. Chand and Co.
- D. Living Eng. Structure; Standard Alien.

ANATOMY & PHYSIOLOGY- ANT14101

UNIT	CONTENTS
1	The Human Body: Definitions, Sub-divisions of Anatomy, Terms of location and position, Fundamental planes, Vertebrate structure of man, Organization of the body cells, Tissues.
2	The Skeletal System: Types of bones Structure and growth of bones Division of the skeleton Appendicle skeleton Axial skeleton Name of all the bones and their parts Joints classification, Types of movements with examples.
3	Anatomy of Circulatory System: Heart Size, Position coverings, Chambers, Blood supply, Nerve supply The blood vessels General plan of circulation Pulmonary circulation Names of Arteries, Veins and their position - Lymphatic system general plan.
4	Anatomy of the Respiratory System: Organs of respiratory, Larynx, trachea, bronchial tree, Respiratory portion, Pleurae and lungs Brief knowledge of parts and position.
5	Anatomy of the Digestive System: Components of Digestive system Alimentary tube Anatomy of organs of digestive tube, Mouth, Tongue, Tooth, Salivary glands, Liver, Biliary apparatus, Pancreas, Names and position and brief functions.
6	Anatomy of the Nervous System: Central nervous system, The Brain, Hind brain, Midbrain, Forebrain, Brief structure,

	Locations, and Peripheral nervous system, Spiral card, Anatomy, Functions, Reflex – Arc, Ménages. Injuries to spinal card and brain.
7	Anatomy of the Endocrine System: Name of all endocrine glands their position, Hormones and their functions– Pituitary, Thyroid, Parathyroid, Adrenal glands, Gonads & islets of pancreas.
8	Anatomy of Excretory system and Reproductive system: Kidneys location, Gross structure, Excretory ducts, Urethras, Urinary bladder, Urethra, Male reproductive system, Testis, Duct system Female reproductive system, Ovaries Duct system, Accessory organs.
9	Physiology: Definitions, Composition, Properties and function of Blood Haemogram (RBC, WBC, Platelet count, HB concentrations) Function of plasma proteins Haemopoiesis Blood Group–ABO and RH grouping Coagulation & Anticoagulants Anemia- Causes effects & treatment Body fluid compartments Composition, Immunity Lymphoid tissue Clotting factors Mechanism of blood clotting Disorders of white blood cells, Disorders of platelets, Disorders of clotting.
10	Cardiovascular System: Function of cardiovascular system Structure of cardiovascular system Cardiac cycle, Functional tissue of heart & their function Cardiac output, E.C.G., Blood pressure, Heart Rate.
11	Respiratory System: Function of respiratory system Functional (physiological) Anatomy of Respiratory system Mechanism of respiration Lung volumes & capacities Transport of respiratory gases.
12	Digestive System: Function of digestive system Functional Anatomy of digestive system Composition and functions of all digestive juices Movements of digestive system (intestine) Digestion & absorption of carbohydrate, Proteins & fats.
13	Nervous System Functions of nervous system Neuron - Conduction of impulses Factors effecting Nervous System Synapse - transmission, Reception, Reflexes, Ascending tracts, Descending tracts Functions of various parts of the Brain Cerebro spinal fluid (CSF)-Composition, Functions & circulation, Lumbar puncture Autonomic Nervous System – Types and functions of (ANS).

14	<p>Special Senses, Vision: Structure of Eye Function of different parts Refractive errors and correction Visual pathways, Color vision & tests for color blindness,</p> <p>Hearing- Structure and function of ear, Mechanism of hearing, Test for hearing (deafness).</p>
	<p>Muscle Nerve Physiology: Type of muscle Structure of skeletal muscle Sarcomere Neuromuscular junction & transmission Excitation and contraction coupling (mechanism of contraction).</p>
15	<p>Structure and Function of Skin: Body temperature, Fever, Regulation of temperature.</p>
16	<p>Excretory System: Excretory Organs, Kidneys, Function, Nephron, Juxta Glomerular apparatus, Renal circulation Mechanism of urine formation Mechanism of micturition Cystometrogram, Diuretics, Artificial kidney.</p>
17	<p>Reproductive System: Structure and function of reproductive system Male reproductive system-Spermatogenesis, Testosterone.</p>
18	<p>Female reproductive system: Ovulation, Menstrual cycle coogenesis, Tests for ovulation, Estrogen & progesterone, Pregnancy test, Parturition, Contraceptive, Lactation, Composition of milk, and Advantages of breast feeding.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Text books of Physiology. Author: Guyton (Arthor C). Prism publishers Bangalore.
- B. Human Physiology. Author : Chaterjee (cc). Medical allied agency
- C. Concise Medical physiology. Author : Choudhary (Sujit km.). New central books Kolkata.
- D. Review Medical physiology. Author : Ganang. Application and Lange.

BASIC BIOCHEMISTRY, PATHOLOGY & MICROBIOLOGY-
MBL14105

UNIT	CONTENTS
1	<p>Introduction to Apparatus: Chemical Balance-Different types, Principles and Practice Concepts of Molecular weight, Atomic weight, Normality, Molarity, Standards, Atomic structure, Valence, Acids, Bases, Salts & Indicators Concepts of Acid Base reaction and Hydrogen ion concentration pH meter & pH buffer Chemistry of Carbohydrates-Definition, Classification and Biological importance Monosaccharides, Oligosaccharides, Disaccharides & Polysaccharides-Classification and Properties.</p>
2	<p>Chemistry of Lipids: Definition, Classification and biological importance Simple lipids, Triacylglycerols and waxes-Composition and functions Compound lipids, Phospholipids, Sphingolipids & Glycolipid-Composition and functions Derived lipids, Fatty acids—Saturated & Unsaturated Steroids and their properties Chemistry of Proteins-Classification and examples.</p>
3	<p>Amino Acids: Classification, Properties, Side chains of amino acids, Charge properties,</p> <p>Protein- Definitions, Classifications and functions</p> <p>Peptides- Biologically active peptides—Examples such as GSH, Insulin— its structure, Structural organization, Conformation and denaturation</p> <p>Chemistry of Nucleic acids— DNA Structure and function, RNA Types, Structure and function.</p>
4	<p>Pathology Introduction: Blood collection Anticoagulants used in Haematology, Normal values in Haematology Basic Haematological Techniques, RBC count, Haemoglobin estimation, Packed cell volume, Calculation or absolute indices</p> <p>WBC counts- Total and differential, Absolute eosinophil count, Platelet count , Erythrocyte sedimentation rate, Reticulocyte count Preparation of blood films Stains used in Haematology Morphology of red cells Morphology of Leukocytes and platelets, Bone marrow, Techniques of aspiration, preparation and staining of films.</p>

5	<p>Bone Marrow Biopsy: Preparation of Buffy coat smears Laboratory methods used in the investigation of Anaemias, B 12 and Folate assay Schilling test Serum Iron and Iron binding capacity Laboratory methods used in investigation of Haemolytic anaemias Osmotic fragility Investigation of G-6 PD deficiency test for sickling Estimation on of Hb-F, Hb-A2, Plasma Haemoglobin and Haptoglobin Demonstration of Hacmosiderin in urine Haemoglobin electrophoresis Test for auto immune hemolytic Anaemias Measurements of abnormal Hb pigments 16.</p>
6	<p>Clinical Pathology: Urine examination Physical, chemical & microscopic examination of body fluids, cell counts, semen analysis, CSF (cerebro spinal fluid), Stool examination.</p>
7	<p>Morphology: Classification of micro organisms, Size, Shape and structure of bacteria Use of microscope in the study of bacteria Growth and nutrition Nutrition, growth and multiplications of bacteria Use of culture media in diagnostic Bacteriology Sterilisation and Disinfection</p> <p>Principles and use of equipments of sterilization namely- Hot Air oven, Autoclave and serum Inspirator. Pasteurization, Anti septic and disinfectants, Antimicrobial sensitivity test</p> <p>Immunology- Immunity Vaccines, Types of Vaccine and immunization schedule Principles and interpretation of commonly done serological tests namely, Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg.</p>
8	<p>Systematic Bacteriology: Morphology, Cultivation, Diseases caused Laboratory diagnosis including specimen collection of the following bacteria (the classification, antigenic, Structure and pathogenicity are not to be taught) Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli, Klebsiella, Proteus,vibrio cholerae, Pseudomonas & Spirochetes, Parasitology.</p>
9	<p>Morphology: Life cycle Laboratory diagnosis of following parasites E. histolytica, Plasmodium, Tape worms, Intestinal nematodes, Mycology, Morphology</p> <p>Diseases caused and lab diagnosis of following fungi- Candida, Cryptococcus, Dermatophytes, opportunistic fungi</p> <p>Virology- General properties of viruses, Diseases caused Lab diagnosis and prevention of following viruses- Herpes, Hepatitis, HIV, Rabies and Poliomyelitis, Hospital infection, Causative agents,</p>

	Transmission methods, Investigation Prevention and control of Hospital infection Principles and practices in Biomedical waste management.
	Principles of Microbiology: Microscope-Different types- Including electron microscope General introduction and History of Microbiology Classification of Microbes-Bacterial cell, Bacterial Growth and Nutrition, Bacterial Metabolism, Bacterial Genetics and Variation, Antibacterial Agents Anti-Septics & Disinfection (Chemical Sterilization) Sterilization (Physical)–Heat, Filters, Radiation, Antibiotics, Chemotherapy and Drug Resistance Collection & Transportations of Specimens.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Biochemistry – Powar and Chatwal
- B. Basic Pathology, Saunders Sixth Edition-Vinay Kumar MBBS MD FRC Path, Ramzi S. Cotran MD, Stanley L. Robbins MD

OCULAR ANATOMY & PHYSIOLOGY- OPH14101

UNIT	CONTENTS
1	Gross Anatomy And Embryology Of Eye: Introduction Gross Anatomy of Eyeball and Orbit- General Anatomy of the Eyeball and Orbit General Shape of the Eyeball Layers of the Eyeball General Concepts of the Structures within the Eyeball Embryology of Eyeball- Specific Embryological Stages of Eyeball Embryology of Specific Ocular Structures Growth and Development of Eye.
2	Anatomy Of The Outer Coat Of The Eyeball: Introduction Anatomy Of The Outer Coat Of The Eyeball- Anatomy of Conjunctiva Coat of Eyeball Anatomy of Cornea Anatomy of Sclera
3	Anatomy Of The Middle Coat of The Eyeball: Introduction, Anatomy of Uveal Tract-

	<p>Anatomy of Iris Anatomy of Ciliary Body Anatomy of Choroid</p> <p>Anatomy of Anterior and Posterior Chambers</p>
4	<p>Anatomy Of Lens: Introduction Anatomy of Lens</p>
5	<p>Anatomy Of The Inner Coat Of The Eyeball And Anatomy Of Vitreous: Introduction</p> <p>Anatomy of Retina and its Special Regions- Anatomy of Retina Special Regions of the Retina</p> <p>Anatomy of Vitreous.</p>
6	<p>Anatomy Of Optic Nerve And The Visual Pathway: Introduction Parts of Visual Pathways Optic Nerve Optic Chiasma Optic Tract Lateral Geniculate Nucleus Optic Radiation Visual Cortex Arrangement of Fibres in Visual Pathway</p>
7	<p>Anatomy Of Lids And Lacrimal System: Introduction Description of Eye Lids and Lacrimal System</p>
8	<p>Eyelids, Lacrimal Apparatus And Tear Film Dynamics: Introduction</p> <p>Structure and Functions of the Eyelids- Functions of the Eyelids Physiology of Eyelid Movements Blinking and Peering</p> <p>Functions of the Lacrimal Apparatus- Tear Secretion Control of Tear Production Tear Drainage</p> <p>Tear Film Dynamics- Functions of Tear Film Physical Properties of Tear Film Tear Dynamics Tear Film Dysfunction Treatment of Dry Eye</p>
9	<p>Aqueous Humour And Intra Ocular Pressure: Introduction</p> <p>Structure and Functions of Aqueous Humour- Formation of Aqueous Humour Aqueous Movement and Outflow Aqueous Composition Physio-chemical Properties of Aqueous</p> <p>Intra-ocular Pressure- Diurnal Variation of intra-ocular Pressure Measurement of Intra-ocular Pressure Increase in Intra-ocular Pressure Lowering Intra-ocular Pressure</p>

	Factors Affecting intra-ocular pressure
10	<p>Pupil And Pupillary Reflexes: Introduction</p> <p>Pupillary Reflexes</p> <p>Pupil- Appearance of the Pupil Accommodation Neuronal Pathways</p> <p>Pupillary Defects- Marcus Gunn Pupil (RAPD) Argyll Robertson Pupil (ARP) Adie's (Tonic) Pupil Homer's Pupil Iris Coloboma</p>
11	<p>Muscles and Movements of the Eye:</p> <p>Extra-ocular Muscles- Recti and Oblique Muscles Planes of Muscles</p> <p>Intra-ocular Muscles Uni-ocular Movements</p> <p>Binocular Movements- Laws Governing Ocular Movements</p> <p>Abnormalities of Gaze- Latent Squint (Anisophoria or Heterophoria) Manifest Squint (Heterotropia) Pseudosquint (Pseudo-false)</p>
12	<p>Vision: Light Sense, Night Vision And Colour Vision: Introduction</p> <p>Visual Impulse and Perception- Initiation of Visual Impulse Transmission of Visual Sensation Analysis of Visual Perception</p> <p>Colour Vision- Young's Trichromatic Theory Details of Colour Vision, Defective Colour Vision</p> <p>Light Sense- Adaptation Dark Adaptation</p> <p>Contrast Sense</p>
13	<p>Visual Pathway, Fields And Visual Cortex: Introduction Retina, Optic Nerve, Optic Chiasma, Optic Tract, Lateral Geniculate Body, Optic Radiations</p> <p>Visual Cortex- Physiological Aspects</p> <p>Visual Fields-</p>

	Perimetry Methods of Visual Field Examination
14	Visual Acuity, Uni-Ocular And Binocular Vision: Measurement of Visual Acuity- Test Types Snellen's and Landolt's Binocular Vision- Advantages of Binocular Vision Retinal Correspondence Horopter (Horizon of Vision) Pannum's Area Tests for Binocular Single Vision
15	Accommodation And Convergence: Introduction Accommodation- Mechanisms Theories of Accommodation Convergence
16	Electro-Physiology Of The Eye: Introduction Electro-retinogram Visual Evoked Response Electro-oculogram

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Ocular Anatomy and Physiology-Al Lens, Comt Comt, Sheila Coyne Nemeth, Janice K. Ledford-Slack Incorporated
- B. Ophth Assistant Vol-V (Community Ophth) - Dr. L.P. Agarwal

OCULAR PHARMACOLOGY- OPH14102

UNIT	CONTENTS
1	Routes of Administration: Routes of Drug Administration in Ophthalmology, Local Application, Systemic administration Routes of Drug Administration in Common Ocular Inflammatory Conditions.
2	Miotics, Mydriatics and Cycloplegics: Description of Drugs, Miotics, Mydriatics and Cycloplegics.
3	Antiglaucoma Agents: Classification, Description of Different Antiglaucoma Drugs, Beta Blockers, Cholinergic Agents, Sympathomimetics, Carbonic Anhydrase Inhibitors, Alpha Adrenergic Agonists, Prostaglandins, Hyperosmotic Agents.
4	Anti-inflammatory and Anti-allergic Agents: Steroids- Classification Mechanism of Action

	<p>Routes of Drug Administration Indications Formulations Complications</p> <p>Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)- Classification Mechanism of Action Routes of drug administration Indications of NSAIDs in Ophthalmology Formulations Complications</p> <p>Ocular Anti-allergic Agents- Classification Description of Anti-allergic Agents.</p>
5	<p>Antibiotics, Antifungal and Antiviral Agents Used in Ophthalmology: Antibacterial Agents Antifungal Agents Antiviral Agents</p>
6	<p>Ophthalmic Dyes, Irrigating Solutions, Artificial Tears and Viscoelastics: Ophthalmic Dyes- Fluorescein Sodium Rose Bengal Lissamine Green Indocyanine Green Trypan Blue Vertiporfin (Visudyne)</p> <p>Irrigating Solutions- Balanced Salt Solutions (BSS) Balances Salt Solution Plus (BSS Plus) Normal Saline (0.9 Per cent NaCl) Plasma Lyte 148 Lacted Ringer's Solutions S-MA2 Dextran Containing Irrigation Solutions (DIS) Glucose Fortified BSS Plus</p> <p>Artificial Tears/Ocular Lubricants</p> <p>Viscoelastics and Other Surgical Adjuncts- Sodium Hyaluronate Chondroitin Sulphate Sodium Hyaluronate and Chondroitin Sulphate Hydroxypropyl Methylcellulose</p>
7	<p>Chelating Agents, Immunosuppressives, Antiseptics and Disinfectants and Enzymes: Chelating Agents- Ethylene Diamine Tetra Acetate (EDTA) Desferrioxamine</p>

	<p>British Anti-Levisite (BAL) Penicillamine Alpha Cysteine</p> <p>Immunosuppressive- Azathioprine Mercaptopurine, Methotrexate, Mechlorethamine, Chalormabucil, Cyclophosphamide, Treethylene Thiophosphoramidate, Mycophenolate Mofetil, Cyclosporine</p> <p>Antiseptics and Disinfectants- Betadine (Providone-Iodine 0.5 per cent w/v) Chlorocresol, Certimide, Cresol, Ultra-Violet Light, Ethylene Oxide, Ethanol, Fromaldehyde, Glutaraldehyde, Benzalkonium, Phenol (Carbolic Acid), Acetone</p> <p>Enzymes- Alpha Chymotrypsin Urokinase Hyaluronidase.</p>
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LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Ocular Pharmacology and Therapeutics: A Primary Care Guide By Michael J. Doughty Clinical
- B. Ocular Pharmacology By Jimmy D Bartlett, O.D., Siret D. Jaanus, Jimmy D. Bartlett

HOSPITAL TRAINING-I-TRN14101

YEAR II

FUNDAMENTALS OF COMPUTER SCIENCE- CSC14207

UNIT	CONTENTS
1	Computer Application: Characteristic of computers, Input, output, storage units, CPU, Computers system.
2	Computers Organization: Central Processing Unit, Control Unit, Arithmetic Unit, Instruction Set, Register, Processor Speed.
3	Memory: Main Memory, Storage Evaluation Criteria, Memory Organization, Memory Capacity, Random Access Memories, Read Only Memory, Secondary Storage Devices, Magnetic Disk, Floppy and Hard Disk, Optical Disks CD-ROM, Mass Storages Devices.
4	Input Devices:

	Keyboard, Mouse, Trackball, Joystick, Scanner, Optical Mark Reader, Bar-code reader, Magnetic ink character reader, Digitizer, Card reader, Voice recognition, Web cam, Video Cameras.
5	Output Devices: Monitors, Printers, Dot Matrix Printers, Inkjet Printers, Laser Printers, Plotters, Computers Output Micro Files (Com), Multimedia Projector.
6	Operating System: Microsoft Windows, An overview of different version of windows, Basic windows elements, File managements through windows, Using essential accessories: System tools Disk cleanup Disk defragmenter, Entertainments, Games, Calculator, Imagine-Fax, Notepad, paint, Word Pad, Recycle bin, windows Explorer, Creating folders icons.
7	Word Processing: Word processing concepts, Saving, closing opening and existing documents, Selecting text, edition text, Finding and replacing text, Printing documents, Creating and printing merged documents, Mail merge, Character and paragraph formatting, Page designs and Layout, Editing and proofing tools checking and correcting spelling, Handling graphics, Creating tables and charts, Documents templates and wizards.
8	Presentation Package: Creating opening and saving presentations, Creating the look of your presentation, Working in different views working with slides, Adding and formatting text, formatting paragraphs, Checking spelling and correcting typing mistakes, Making notes pages and handouts, Drawing and working with objectives, Adding clip art and other pictures, Designing slides shows, Running and controlling a slid show, Printing Presentations.
9	Internet and Email: Use of Internet and Email, Internet, Websites (Internet Sites), The Mail protocol suite.
10	Hospital Management System: Types and Uses, Hospital Management & System Package, Advanced Hospital Management System, X O Hospital Management System, LCS Hospital Management Information System, NVISH Hospital Management System, CSPM-Hospital Management System.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Foundations of computing first edition, 2002 : P.K. Sinha and P. Sinha.
- B. Reading 2- Microsoft office 2000 for window, second Indian Print, person education:S. Sagman.

PHYSICAL & GEOMETRIC OPTICS- OPT14201

UNIT	CONTENTS
1	Properties Of Light: Properties of Light Propagation of Light- Types of Waves Measurable Parameters of Waves Electromagnetic Spectrum Photobiology-

	<p>Photon Ray Law of Inverse Squares Formation of Image.</p> <p>Interference- Huygens' Principle Uses of Interference Laser Interferometer.</p> <p>Polarization- Clinical Applications of Polarization.</p>
2	<p>Principle of Reflection and Refraction: Laws of Reflection, Reflection through Plane Mirrors. Reflection through Spherical Mirrors-General Aspects of Reflection Sign Convention of Rays</p> <p>Images- Position of Image, Images in Concave Mirrors, Images in Convex Mirrors.</p> <p>Refraction of Light- Factors Affecting the Bending of Light, General Aspects of Refraction. Laws of Refraction- Refractive Index, Critical Angle, Total Internal Reflection.</p> <p>Refraction through Various Surfaces- Refraction through Glass Plate, Refraction at Curved Surfaces</p> <p>Prisms- Refraction through Prisms, Polychromatic Effects, Nomenclature of Prisms, Rotating Prisms, Uses of Prisms.</p>
3	<p>Lenses: Types of Lenses, Formation of Convex Lenses, Formation of Concave Lenses.</p> <p>Geometrical Construction of Images- Principal Axis or Optical Axis, Focal Length, Dioptre. Determination of Optical Centre of the Lens</p> <p>Image Formed by Various Lenses- Image Formation by Convex Lenses, Image Formation by Concave Lenses. Size and Position of Image.</p> <p>Cylindrical Lenses- Convex Cylinder, Concave Cylinder, Sturm's Conoid.</p> <p>Combination of Lenses- Gauss Theorem, Combination of Cylindrical Lenses</p>
4	<p>Visual Angle: Visual Acuity- Components of Visual Acuity, Factors Affecting Visual Acuity. Measurement of Visual Acuity Test types used in Adults Test types used in Children Objective Assessment of Vision Assessment of Near Vision.</p>
5	<p>Axes of the Eye- Optical Axis, Visual Axis, Fixation Axis</p>

	<p>Visual Angles- Angle Alpha, Angle Gamma, Angle Kappa</p> <p>The Dioptric Notation of Lenses (Vergence)- The Advantages of the Dioptric Notation Vergence, The Notation of Cylinders, The Detection Measurement of Lenses</p> <p>Optical Systems- Refraction by Combination of Lenses, Compound Homocentric Systems, Thick Lenses.</p>
6	<p>Optical Aberrations: Optical Aberrations of Lenses, Aberrations Depending Upon the Light, Monochromatic Aberrations. Optical Aberrations of the Eye- Aberrations Depending Upon the Light, Monochromatic Aberrations. Anomalies as a Dioptric Apparatus.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Geometrical And Physical Optics By R.S. Longhurst

OCULAR DISEASES- OPH14201

UNIT	CONTENTS
1	<p>OCULAR DISEASES I: Eyelid anatomy B Congenital and developmental anomalies Blepharospasm, Ectropion, Entropion, Trichiasis and symblepharon</p> <p>Eyelid inflammations, Eyelid tumors, Ptosis, Eyelid retraction, Eyelid trauma</p> <p>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.</p>
2	<p>Common Eye Diseases: Disease of Eyelids, Disease of Orbit, Diseases of Adnexa, Disease of Conjunctiva, Diseases of Cornea, Disease of Sclera, Disease of Uvea, Disease of Lens, Glaucoma, Disease of Retina</p> <p>Injuries- Injuries of Eye, Optic Nerve, Sclera Episclera: Ectasia and staphyloma, Scleritis and episcleritis</p> <p>Orbit- Orbital anatomy, Incidence of orbital abnormalities, Methods of orbital examination, Congenital and development anomalies of the orbit, Orbital tumors, Orbital inflammation, Sinus disorders affecting the orbit, Orbital trauma.</p>
3	<p>Conjunctiva And Cornea: Inflammation</p>

	<p>Therapeutic principles Specific inflammatory diseases</p> <p>Tumors- Tumor of epithelial origin Glandular and adnexal tumors Tumors of neuroectodermal origin Vascular Tumors, Xanthomatous origin, Inflammatory tumors, Metastatic lesions</p> <p>Degeneration and dystrophies- Definition Degeneration's , Dystrophies Miscellaneous Conditions Kerato conjunctivitis Sicca (K-Sicca)</p> <p>Tear function tests Steven Johnson syndrome Ocular Rosacea</p> <p>A topic eye disorders Benign mucosal pemphigoid (BMP) ocular pemphigoid Vitamin A deficiency Metabolic diseases associated with corneal changes.</p>
4	<p>Iris, Ciliary Body And Pupil: Congenital anomalies Primary and secondary diseases of the iris and ciliary body Tumors Anomalies of papillary reaction</p> <p>Choroid: Congenital anomalies of the choroid, Diseases of the choroid, Tumors.</p>
5	<p>Vitreous Developmental Abnormalities: Hereditary hyaloidoretinopathies Juvenile retinoschisis Asteroid hyalosis Cholestrololosis Vitreous hemorrhage, Blunt trauma and vitreous, Inflammation and vitreous, Parasitic infestations, Pigment granules in the vitreous, Vitreous complication sin cataract surgery.</p>
6	<p>Retina-Retinal vascular Anomalies: Disease of the choroidal vasculature Bruch's membrane and retina pigment epithelium (RPE) Retinal tumors and retinoblastoma Other retinal disorders Retinal inflammations Metabolic diseases affecting the retina, Miscellaneous disorders Electromagnetic radiation effects on the retina Retinal physiology and psychophysics Hereditary macular disorders (including albinism) Peripheral retinal degeneration Retinal holes and detachments Intraocular foreign bodies Photocoagulation.</p>
7	<p>Neuro ophthalmology history & visual functions test:</p>

	<p>Technique of papillary examination Ocular motility Checklist for testing Visual sensory system The retina optic disc Optic nerve Optic chiasma Optic tracts The lateral geniculate body Optic radiations visual cortex The visual field Disorders of visual system Ocular motor system Supranuclear control of eye movements Saccadic system Clinical disorders of the saccadic system Gaze palsies Parkinson's disease Smooth pursuit system and disorders Non visual reflex system Position maintenance system Nystagmus Ocular motor nerves and medial longitudinal fasciculus The facial nerve, pain and sensation from the eye, Autonomic nervous system, selected system disorders with neuro ophthalmologic signs.</p>
8	<p>Anatomy and path Physiology Normal anatomy and aging process Developmental defects Acquired lenticular defects.</p>
9	<p>Trauma: Anterior segment trauma Posterior segment trauma.</p>
	<p>Blindness Definitions: Causes, Social implications, Rationale therapy, Drug induced ocular disease.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Ocular Disease: Mechanisms and Management E-Book: Mechanisms and Management By Leonard A Levin, Daniel M. Albert
- B. Diagnosis of ocular diseases by Thomas George Atkinson

DISPENSING OPTICS- OPH14202

UNIT	CONTENTS
1	Lens-Form and Analysis: Spherical Lenses, Standard Lens Form, Astigmatic Lens, Cylindrical Lenses, Toric Lens, Base Curve
2	Writing Prescription and Transposition: Writing Prescription, Simple Transposition, Rule of Simple Transposition, Toric Transposition, Steps of Toric Transposition.
3	Power Specification and Measurement: Lens Power, Power Specification, Surface Power, Approximate Power, Vertex power, Effective Power, Power Measurement Hand Neutralization, Lensometer, Geneva Lens Measure.
4	Optical Prisms-Uses and Decentration: Terminology, Properties of Prisms, Units for Specifying Power of Prism, Effect of Prism on movement of Eye, Prentice Rule, Use of Prism in Spectacle, Other Type of Prisms, Risly Prism, Slab Off prism, Fresnel Press on Prism.
5	Ophthalmic Raw Materials and Manufacturing: Glass lens Materials Manufacturing of Glass Plastic Lens Materials, Manufacturing of Plastic Lenses Impact Resistance Lenses, Heat Tempering process, Chemical Tempering Lenses.
6	Lens Surfacing and Glazing: Surfacing Step of Lens Surfacing Glazing, Laying off, Lens Cutting and Edging Formers, Edge Form.
7	Lens Quality and Inspection: Faults, Defects Occurring during Manufacturing Process, Surface Faults, Errors in Power of Lens.
8	Frame Nomenclature and Materials: Frame Parts, Frame front, Frame Temples, Bridge Area, Plastic Bridge, Saddle Bridge, Modified Saddle, End Piece Construction, Plastic end Piece Construction, Metal and piece Construction, Temple Construction.
9	Frame Measurement and Markings: Objective, Introduction, Datum System, Boxing System, Temple Length, Frame marking Conventions, Minimum Lens Size.
10	Frame Selection Cosmetic Dispensing: Frame Shape and Face Shape, Facial Types, Affecting Facial balance, Frame Lines, Frame Colour and Hair Colour, Facial Features, Frame Thickness, Fitting Consideration, The Bridge, The Significant Angles for Fitting, Adjustable Pads, Frame Selection for the Purposes, Selecting Frames for Progressive Lens Wearer, Selecting Frames for High Minus Lenses, Selecting Frames for High (+) Lens, Selecting Frames Children, Selecting Frames for Older Wearer's, Selecting Frame for Safety of Eyewear,
11	Special Purpose Frames: Special Purpose Frame, Sports Spectacles.
12	Bifocal and Trifocal Lenses: Bifocals, History of Bifocals, Terminology of Bifocals, Type of Bifocals, Fuses Bifocals, One-Piece Bifocals, Cement Lenses, Fitting and Dispensing Bifocals, Fitting Height, Ordering Bifocals, Instruction for the Patient, Limitation of Bifocal Lenses, Trifocal Lenses, Types of Lenses.
13	Progressive Additional Lenses:

	Progressive Addition Lenses, Advantage of Progressive Lenses, Disadvantages of Progressive Lenses, Optical Properties, Hard and Soft Design, Mono Design and Multi Design, Asymmetrical and Symmetrical Designs, Indications and Contra-Indications, Indications of Progressive Lenses, Contraindications for Progress Lens, Frame Selection, Pre-adjust frames, Measurement fitting Height, Measure Monocular PD, Verify Cut Out, Instruction for Progressive user, Trouble Shooting for PALS, Progressive Lenses Available in the Market.
14	Absorptive and Protective Lenses: Electro Magnetic Spectrum, Tinted Lenses, Antireflection Coatings, Antilog Coating, Scratch Resistant Coating, Mirror Coating, Photochromatics, Glass Photochromatics, Plastics Photochromatics, Polarizing Lenses, Principle of Polarizing lens, Use of Polarizing Lenses.
15	Aspheric, High Index and Specials Lenses: Aspheric Lenses, Principles of Aspheric Lens, Advantage of Aspheric Design, Fitting Guidelines for Aspherics, High Index Lenses, Advantage of High Index Lenses, Disadvantage of High Index Lenses, Lenticular Lenses, Lenticular Plus Design, Lenticular Minus Design.
16	Interpupillary Distance: Interpupillary Distance, Distance PD, Monocular PD, Pupillometer, Near PD.
17	Ordering and Verification: Ordering Lenses, Single Vision Lenses, Bifocals, Progressive Lenses, Frame Specifications, Lens Material, Tints and Coating, Order Form, Lens Verification.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Ophthalmic Lenses & Dispensing By Mo Jalie
- B. Optics by Ajoy Ghatak, Tata McGraw-Hill Education (2012)

HOSPITAL PROCEDURES- HHM14202

UNIT	CONTENTS
1	Definition and Classification of Hospitals: Definition of Hospital Classification of Hospitals According to Directory of Hospitals According to Ownership and Control According to the Systems of Medicine According to the Bed Strength According to Clinical Basis According to Length of Stay of Patients Hospital as System, Function of Hospitals, Hospital Organogram, Role of Hospital in Primary Health Care.
2	Hospital Organization: Hospital as an Organization, How a Hospital Works? Organization, Professional Service Department in Hospital Organization Special Features of an Eye Hospital, Role of Hospital, Staffing.

3	<p>Role of a Hospital: Role of Hospitals Functions of Hospitals-To take care of sick and Injured, To take preventive care and Health Promotion of Community Surveillance Centre, Continuing Care of Patients, Rehabilitation Education and Training of Staff, Research Role of Hospital and Peculiarities Hospital as a System Hospital as Community institution Changing Role of Hospitals-Challenges and Strategies-The problem Land Mark of Efficiency of Hospital.</p>
4	<p>Public Relation and Image of Hospital: Concept of Public in Hospitals Public Relations Department Patient's Expectation and Satisfaction, Conflicts.</p>
5	<p>Outpatient Services, Accident and Emergency Services: Outpatient Department-Role and Functions, Types Planning Considerations of OPD-Physical Facilities and Layout, Equipment, Staffing, Accident and Emergency Department- Definitions, Development and Scope, Functions, Type of Emergency Services, Importance, Planning Consideration for Accident and Emergency Department, Locations, Space Requirement and Patient Wards Physical Facilities and Layout Architectural Design Communication, Equipment requirements of Accident and Emergency Department Staffing Consideration.</p>
6	<p>Operation Theater and Indoor Patient, Department: Types of Operation Theaters, Design Considerations for OT, Location, Size of the Operating Room, Zoning, Equipment, Staffing, Policy and Procedures for OT, Operating Schedule, Administration of OT, Punctuality, Theater Staff, Operating List, Outpatient Cases, Transportation of Patients, Maintenance of OT and Aseptic Standard, Functions of Indoor Patient Department, Planning and Organizing Inpatient Unit, Policy of the Hospital, Physical Facilities, Staffing. Policy, Procedure, Management, Monitoring and Evaluation, Factors Influencing Inpatient Care.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. A Complete Hospital Manual of Instruments and Procedures by Kapur-Jaypee Brothers

HOSPITAL TRAINING-II-TRN14201

VISUAL OPTICS- OPH14301

UNIT	CONTENTS
1	Myopia: Emmetropization, Myopia, Etiology of Myopia, Classification of Myopia, By Clinical Appearance, On the Basis of Degree, On the Basis of age of Onset, Clinical Features of Myopia, Visual Acuity and Magnitude of Myopia, Signs and Symptoms of Myopia, Degenerative Myopia, Correction of Myopia, Prescription Guidelines.
2	Hypermetropia: Classification of Hypermetropia, On the Basis of Etiology, By Clinical Appearance, By Degree of hypermetropia, By Accommodative Status, Clinical Feature Hypermetropia, Management of Hypermetropia Aphakia- Cause of Aphakia, Sign and Symptoms of Aphakia, Optics of Aphakia, Refraction. Correction Options for Aphakia
3	Astigmatism: Astigmatism- Causes of Astigmatism, Signs and Symptoms of Astigmatism, Diagnosis of Astigmatism, Classification of Astigmatism, Type of Astigmatism Classification According to Focus, Treatment of Astigmatism, Prescription Guidelines.
4	Presbyopia: Presbyopia Cause of Presbyopia, Presbyopia and Different Refractive Condition Reading Addition, Different Types of Presbyopic Correction Reading Glasses, Bifocals, Progressive Addition Lenses, Monovision.
5	Anisometropia and Aniseikonia: Anisometropia Classification of Anisometropia Sign and Symptoms of Anisometropia Management of Anisometropia Aniseikonia, Etiology, Classification, Features of Aniseikonia Clinical Measurement of Aniseikonia, Knapp's law. Spectacle Magnification, Relative Spectacle Magnification.
6	Visual Acuity: Factors Affecting Visual Acuity Components of Visual Acuity Log Mar Charts, Clinical Testing of Visual Acuity, Chart Illumination, Testing Distance, Testing Procedures, Clinical Significance of Visual Acuity Assessment, Pediatrics Visual Acuity Testing, Preschool Children, Visual Acuity Testing for Infants and Toddlers, Near Visual Acuity.
7	Contrast Sensitivity and Glare Testing: Contrast, Contrast Sensitivity Tests, Arden Plates, Vistech Charts, Cambridge Low Contrast Grating Test, Pelli Robson Letter Chart, Regan's Law Contrast Acuity Chart, Clinical Significance of Testing Contrast, Glare, Disability Glare, Discomfort Glare, Reflected Glare, Management of Glare.
8	Color Vision: Color Vision Defect Color Vision Testing Pseudo Isochromatic Plate Tests Arrangement Tests Anomaloscopes

	Management of Patients with color defects.
9	Accommodation: Range and Amplitude of Accommodation, Amplitude of Accommodation, Methods of Measurement, Relative Accommodation.
10	Convergence: Measurement of Convergence Range and Amplitude of Convergence Measurement of Convergence Components of Convergence Relative Convergence Accommodative Convergence/Accommodation Ratio Clinical Measurement of AC/A Ratio.
11	Anomalies of Accommodation: Insufficiencies of Accommodation, Presbyopia, Cyclopedia, III-Sustained Accommodation, Inertia of Accommodation, Paralysis of Accommodation, Spasm of Accommodation, Anomalies of Convergence, Convergence Insufficiency, Convergence Excess.
12	Objective Refraction: Instrumentation and use Change of Beam Types of Retinoscopy-Methodology, Difficulty Situation of Retinoscopy Auto Refraction, Auto Refractors Based on Scheimner's Principles Autorefractors based on optometric principles Clinical Use of Automated Refractors.
13	Subjective Refraction: Best vision sphere, Fogging, Duochrome Test, Sphero Cylindrical Refraction, Jackson's Cross Cylinder, Stenopaic Slit, Equivalent Sphere, Binocular Balancing, Prism Dissociation, and Alternate Occlusion.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Clinical Visual Optics By Arthur George Bennett, Arthur G. Bennett Ronald B. Rabbetts-BH
- B. Optics by M. H. (Michael Harold) Freeman, C. C. Hull, Ph.D., W. N. Charman-Elsevier Health Sciences

ORTHOPTICS- OPH14302

UNIT	CONTENTS
1	Binocular Single Vision and Space Perception: Definition and concept Grades of BSV- Grade I-Simultaneous Macular Perception Grade II- Fusion Grade III- Stereopsis Mechanism of BSV Development and Advantage of BSV Anomalies of BSV- Diplopia

	<p>Confusion Suppression Abnormal Retinal Correspondence.</p>
2	<p>Physiology of Ocular Movement: Axis of Fick Ocular Movement Positions of Gaze Ocular Movement- Unioocular Laws of Ocular Motility</p>
3	<p>Classification and Evaluation of Squint: Classification of Squint History Taking in Patients with Squint General and Ophthalmic Examination in a Patient with Squint- Visual Acuity Assessment Fundus Examination General Appearance Head Posture</p> <p>Measurement of Ocular Deviation- Detection of Squint Estimation of Angle of Squint Measurement of Deviation</p> <p>Examination of Ocular Movements Orthoptic Instruments</p> <p>Measurement of Ac/A Ratio- Background Methods of Measurement.</p>
4	<p>Amblyopia: Amblyopia- Definition, Classification, Characteristics, Investigations of Amblyopia, Treatment of Amblyopia.</p>
5	<p>Heterophorias: Classification, Decomposition of Heterophoria, Symptoms of Heterophorias, Investigations of Heterophoria, Management.</p>
6	<p>Tropias: Concomitant Esotropias- Background Information and Classification Accommodative Esotropia Non-Accommodative Esotropia Secondary Esotropia</p> <p>Exotropia- Background Information and Classification Primary Exotropia Sensory Exotropia</p>

	Consecutive Exotropia
7	<p>Vertical Squint: What is Vertical Squint? Classification Types Clinical Features Clinical Examination and Investigations Alternative Sursumduction or Dissociated Vertical Divergence A-V- Pattern Brown Syndrome Double Elevator Palsy Congenital Fibrosis Syndrome Mobious Syndrome Neruogenci Causes of Strabismus- Oculomotor (Third Nerve) Palsy Fourth (Trochler) Nerve Palsy.</p>
8	<p>Paralytic Squint: What is Paralytic Squint? Classification of Paralytic Squint</p> <p>Etiology- Congenital Acquired Differences Between Congenital and Acquired Ocular Muscle Palsy Clinical Characteristics Stages of Paralytic Squint Chief Diagnostic Features of Extrinsic Ocular Muscles Palsies Types of Ocular Palsies- Total Ophthalmoplegia External Ophthalmoplegia Internal Ophthalmoplegia Oculomotor/3rd Nerve Palsy: MR, SR, IR, IO Palsy Trochlear or 4th Nerve Palsy Abducen/5th Nerve Palsy Pathological Sequelae of Extrinsic Ocular Muscle Palsy</p> <p>Differences between Ordinary Non-Ocular Torticolli's and Ocular Torticolli's Differences between Paralytic and Non Paralytic Squint Investigations of a Paralytic Squint: History Examination of the Positions of the Eye and Head Visual Acuity Refraction Ophthalmoscopy Cover Test Past Pointing:Malprojection Ocular Movement Worth's Four Dot Test Synaptophore (Amblyoscope) Krimsky Test</p>

	<p>Diplopia Chart- Hess Screen Examination Less Screen Field of Binocular Function</p> <p>Restrictive Squint Management- Medical Management Surgical Management.</p>
9	<p>Special Forms of Strabismus: Special Forms of Strabismus- Duane Retraction Syndrome (DRS) Brown Syndrome Monocular Elevation Deficiency (Double Elevator Palsy) Congenial Fibrosis Syndrome Strabismus After Ocular Surgery (Cataract, Glaucoma, Retinal Detachment) Strabismus Fixus Strabismus in the Craniofacial Syndromes.</p>
10	<p>Nystagmus: Nystagmus- Domination, Classification, Etiology, Features, Types, Management.</p>
11	<p>Refractive Therapy in the Management of Strabismus: The Process of Emmetropization, Methods of Refraction, Refraction and Strabismus, Refractive Errors and Binocular Single vision, Dispensing Spectacles in Ocular Motility Disorders, Prisms in Ocular Motility Disorders.</p>
12	<p>Non-Surgical Management of Strabismus: Treatment of Amblyopia Optical Management- Spherical Lenses Prisms Orthoptic Treatment- Anti-suppression Exercises Exercises for Control of Deviation Exercises for Increasing Flexibility of Accommodation and Convergence</p> <p>Pharmacological Treatment- Miotics Chemo-denervation by Botulinum toxin A.</p>
13	<p>Surgical Management of Strabismus: Aims and Principle of Surgery Anatomical Considerations Pre-Operative Evaluation and Assessment Preparation for Surgery Guidelines and Surgical Techniques for Strabismus Surgery Complications of Squint Surgery Post-Operative Care.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

A. Clinical Orthoptics By Fiona J. Rowe-Wiley Blackwell

**OPTOMETRIC INSTRUMENT & CLINICAL EXAMINATION OF
VISUAL SYSTEM- OPH14303**

UNIT	CONTENTS
1	Refractive Instruments: Test charts standards Choice of test charts Trial case lenses- Best form lenses, Refractor head units, Optical considerations of refractor units Trial frame design Near vision difficulties with units and trial frame Retinoscope- Types available Adjustments of retinoscopes- Special features, Cylinder retinoscopy, Interpretation of objective findings Interpretation of objective tests- Polarising and Displacement etc Simultan test, Projection charts, Illumination of the consulting room special instruments, Brightness acuity tester, Vision analyzer, Video acuity test, Pupilometer, Lensometer, Lens gauge or clock Refractionometer, Keratometer and Corneal Topography
2	Other Instruments: Slit lamp Tonometer- Principles, Uses and types, Ophthalmoscopes and related devices.
3	Special Equipments: Fundus camera, Orthoptic instruments, Colour vision testing devices Fields of vision and screening devices Ophthalmic Ultra Sonography- ultrasound/ A scan/ Bscan/ UBM Electrodiagnostics- ERG/VPG/EOG, Nerve fiber analyzer, Scanning laser devices.
4	Clinical examination of the visual system: History of the ophthalmic subject Ocular symptoms The past prescriptions-it's influence Visual acuity testing-distance, Near and colour vision Examination of Muscle balance Examination of Eye lids Conjunctiva & Sclera Examination of Cornea, Lens Examination of Iris, Ciliary body and Pupil.

5	<p>Special Examinations: Examination of Intraocular pressure & Examination of angle of Anterior chamber, Ophthalmoscopy – (direct and indirect) Examination of fundus Examination of lacrimal system Examination of orbit Macular function test, Visual. Field charting – (central and peripherers), Neuro-ophthalmological examination.</p>
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LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. Optometry: Science, Techniques and Clinical Management By Mark Rosenfield, Nicola Logan, Mark Rosenfield

CONTACT LENS & LOW VISION AIDS- OPH14304

UNIT	CONTENTS
1	<p>History Of Contact Lens: Corneal anatomy and physiology Corneal physiology and contact lens Preliminary measurements and investigations Slit lamp biomicroscopy Contact Lens Materials, Optics of Contact Lens, Glossary of terms: Contact Lenses</p>
2	<p>Contact Lens Design: Indications and Contraindications of CL- RGP contact lens design Soft contact lens design, Keratometry, Placido's disc, Topography</p>
3	<p>Fitting Philosophies [Introduction To CL Fitting]- Handling of CL fitting of spherical soft CL and effects of parameter changes Astigmatism- Correction options, Fitting spherical RGP CL, Low DK and high DK, 5 effects of RGP CL parameter Changes on lens fitting Fitting in astigmatism Fitting in keratoconus Fitting in Aphakia Pseudophakia Lens care and Hygiene instructions compliance Follow up post fitting examination Follow up slit lamp examination, Cosmetic CL, Fitting CL in children</p>
4	<p>IC CL- Bifocal CL: Continuous wear and extended wear CL 3 Therapeutic CL/Bandage lenses CL following ocular surgeries Disposable CL Frequent replacement lenses Use of secular microscopy and pachymetry in CL Care of CL, CL solutions, Complications of CL, CL modification of finished lenses, Instrumentation in CL practice Checking finished lens parameters</p>

	CL-special purpose-swimming, sports, occupational etc. Recent developments in CL, Review of lenses available in India, Current CL research.
5	Dispensing Optics: Curvature and power measurements of typical contact lenses Edging and polishing curves of contact lenses Visit to factors making lenses and contact lenses
6	Identifying The Low Vision Patients: History, Diagnostic procedures in low vision case management.
7	Optics Of Low Vision Aids: Refraction, Special charts, Radical radioscopy, Evaluating near vision-amsler grid and field defects, Prismatic scanning, Demonstrating aids-optical, Non optical, Electronic.
8	Teaching the patient to use aids including eccentric Viewing training where necessary: Spectacle mounted telescopes and microscopes Guidelines to determine magnification and selecting low vision aids for Distance, intermediate and near view.
9	Children With Low Vision: Choice of tests Aids in different pathological conditions Light Glare and contract in low vision care and rehabilitation Bioptic telescope
10	Optical Devices To Help People With Field Defects: Contact lens combined system Rehabilitation of the visually handicapped.

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. http://www.centreforsight.net/content/148_54/Contact-Lens-and-Low-Vision-Aids.html
- B. Low Vision Aids Practice Author: Bhootra Ajay Kumar-Jaypee Digital

PUBLIC HEALTH & COMMUNITY OPHTHALMOLOGY- OPH14305

UNIT	CONTENTS
1	<p>Concepts In Community Health: Natural History of Disease- Interaction of Agent, Host and Environmental Factors Spectrum of Disease</p> <p>Determinants of Health Levels of Prevention- Primary Prevention Secondary Prevention Tertiary Prevention</p> <p>Indicators of Health- Mortality Indicators Morbidity indicators Disability Indicators Nutritional Status Indicators Utilisation Rates Indicators</p>

	<p>Indicators of social and Mental Health Environmental Indicators Socio-economic Indicators Health Care Delivery Indicators HFA Indicators Indices</p> <p>Epidemiological Surveillance- Definition of Surveillance Purpose/ Use of Surveillance Methods of Surveillance Epidemiological Surveillance System Limitations of Surveillance</p>
2	<p>Health for all and Primary Health Care: Concept, Scope and Vision of HFA Primary Health Care and Components</p> <p>Principles of Primary Health Care- New Course of Action for Health Implications of the Primary Health Care Approach Distribution of Primary Health Care Centers</p> <p>Role of Hospitals in Primary Health Care- Hospitals versus Primary Health Care: A False Antithesis The Need for Hospital Involvement Role and Functions of the Hospital at the First Referral Level Issues in Role of Hospital in Primary Health Care</p> <p>Health for All in the Twenty-first Century- Targets Primary Health Care Infrastructure.</p>
3	<p>Basics Of Epidemiology And Biostatistics: Concept of Epidemiology Important Epidemiological Principles and Concepts- Natural History of Disease Epidemiological Triad Levels of Prevention/Intervention Risk Approach in Health Care Measurement</p> <p>Epidemiological Methods- Descriptive Epidemiological Studies Analytical Epidemiological Studies</p> <p>Epidemic Management- Patterns of Epidemics Epidemic Forecasting and Management Screening</p> <p>Biostatistics- Sampling Measures of Central Tendency Correlation Regression Standard Error of Sampling Distribution Significance Testing Tests of Significance.</p>

4	<p>Prevention of Blindness: Causes of Blindness National Programme for Control of Blindness (NPCB) in India- Objectives Main Activities Assistance for Government Fixed Facilities Assistance to NGO's Organisation Infrastructure D.B.C.S. (District Blindness Control Society) Micro Planning at District Level</p> <p>Vision 2020: The Right to Sight- Strategies and Activities, Strengthening Human Resources Eye Care Infrastructure Management Information System</p> <p>Role of NGO's Programme Organisation.</p>
5	<p>Health Insurance: Historical Overview and Evolution- Constitutional Provision Social Security Concepts</p> <p>Health Insurance Schemes- Central Government Health Scheme (CGHS) Employee state Insurance Scheme</p> <p>Emerging Scenario- Situational Analysis Insurance Regulatory and Development Act (IRDA) Likely Set-up after Privatization.</p>

LEARNING SOURCE: Self Learning Materials

ADDITIONAL READINGS:

- A. www.pitt.edu/super7/23011-24001/23721-23731.ppt
- B. Community Ophthalmology-P.J. Graham

HOSPITAL TRAINING-III-TRN14301

YEAR IV

The distance learner should submit the following records at the end of the fourth year and detailed plan on both records are to be intimated to the University on or before the annual examination of the third year.

OPHTHALMIC CASE STUDIES- CST14401

The distance learner should submit a report on the data available with the secondary level (or higher) hospital on the specific critical diseases of the locality. The report should contain at least five cases on locale specific diseases on which treatment and care have been rendered for more than one month.

OPTOMETRY REFLECTIVE REPORT- RPT14401

The distance learner should submit a detailed report relating to the experiences on strategies, procedures and technological practices under the guidance of an ophthalmic expert not below the level of M.S. (Ophthalmology). The learner should spend minimum 45 days in each of the areas listed below for a total period of 6 months.

Areas:

1. Clinical Optometry: Contact lenses, Binocular vision & Low vision.
2. Investigative Optometry
3. Dispensing Optics
4. Community Optometry