B.Sc., Optometry – Curriculum & Syllabus
2020-2021 Batch

SEMESTER I

S.No	Subject code	Subject Title	Theory/Lab	Credit
1		Functional English Communication	Theory	3:0:0
2	20OP2001	Physical and Geometrical Optics I	Theory	3:0:0
3	20OP2002	General Anatomy and General Physiology	Theory	3:0:0
4	20OP2003	Principles of Lighting	Theory	3:0:0
5	20OP2004	Basic Biochemistry	Theory	3:0:0
6		Functional English Communication	Lab	0:0:2
7	20OP2005	Physical and Geometrical Optics	Lab	0:0:2
			Total credits -	19

SEMESTER II

S.No	SUBJECT CODE	Subject Title	Theory/Lab	Credit
1	20OP2006	Physical and Geometrical Optics II	Theory	3:0:0
2	20OP2007	Computer Programming	Theory	3:0:0
4	20OP2008	Nutrition	Theory	3:0:0
5	20OP2009	Management Principles and Basic Accountancy	Theory	3:0:0
6		Environmental science	Theory	3:0:0
7	20OP2010	Hospital Procedures	Lab	0:0:3
8	20OP2011	Computing and Computer Applications	Lab	0:0:3
			Total credits -	21

SEMESTER III

S.No	SUBJECT CODE	Subject Title	Theory/Lab	Credit
1	20OP2012	Optometric Optics I	Theory	3:0:0
2	20OP2013	Ocular Diseases I	Theory	3:0:0
3	20OP2014	Visual Optics I	Theory	3:0:0
4	20OP2015	Ocular Anatomy and Ocular Physiology	Theory	3:0:0
5	20OP2016	Pathology and Microbiology	Theory	3:0:0
6	20OP2017	Visual Optics lab I	Lab	0:0:2
7	20OP2018	Clinics I	Lab	0:0:2
			Total credits -	19

SEMESTER IV

S.No	SUBJECT CODE	Subject Title	Theory/Lab	Credit
1	20OP2019	Optometric Optics II	Theory	3:0:0
2	20OP2020	Ocular Diseases II	Theory	3:0:0
3	20OP2021	Visual Optics II	Theory	3:0:0
4	20OP2022	Optometric Instrumentations	Theory	3:0:0
5	20OP2023	Optometric Instrumentations lab	Lab	0:0:3
6	20OP2024	Visual Optics lab II	Lab	0:0:3
7	20OP2025	Clinics II	Lab	0:0:3
			Total credits -	21

SEMESTER V

S.No	SUBJECT CODE	Subject Title	Theory/Lab	Credit
1	20OP2026	Clinical Examination of Visual System	Theory	3:0:0
2	20OP2027	Clinical Psychology	Theory	3:0:0
3		Entrepreneurship and business plan	Theory	3:0:0
4	20OP2029	Low Vision Aids	Theory	3:0:0

	20OP2030	Dispensing Optics	Theory	3:0:0
5	20OP2031	Binocular Vision	Theory	3:0:0
6	20OP2032	Low Vision Aids lab	Lab	0:0:2
7	20OP2033	Dispensing Optics lab	Lab	0:0:2
			Total credits -	22

SEMESTER VI

S.No	Subject code	Subject Title	Theory/Lab	Credit
1	20OP2034	Glaucoma	Theory	3:0:0
2	20OP2035	Pediatric Optometry and Geriatric Optometry	Theory	3:0:0
3	20OP2036	Contact Lens	Theory	3:0:0
4	20OP2037	Occupational Optometry	Theory	3:0:0
5	20OP2038	Systematic Diseases	Theory	3:0:0
6	20OP2039	Clinics and Special Clinical I	Lab	0:0:3
7	20OP2040	Clinics and Special Clinical II	Lab	0:0:3
			Total credits -	21

SEMESTER VII and VIII

S.No	Subject Title	Theory/Lab	Credit
1	Internship at Eye Hospitals	Lab	0:0:40
		Total credits -	40

Total credits =163

20OP2001 PHYSICAL AND GEOMETRICAL OPTICS I

Credits 3:0:0

Course Objective

1. To illustrate the working of various laws related to optical phenomenon.
2. To enlighten the students about the various optical parameters such as Interference, Diffraction and Polarisation and its functions in analytical instruments
3. To demonstrate the advanced principles of physical optics in instruments.

Course Outcome

At the end of the course, the student will able to

1. Describe the usage of various theories and components of light.
2. Report the effect of interference of light on lenses.
3. Apply knowledge of combination of optical principles such as interference, diffraction, polarization in optical elements.
4. Design an optical system, component to meet desired needs of optometry.
5. Solve problems in optical physics and lens assembly.
6. Demonstrate the techniques, skills, and modern tools necessary for optical physics in analytical instruments

Module 1 LIGHT AND STIMULUS OF VISION

Nature of light-Huygens's wave theory-Einstein's quantum theory-Dual Nature theory-Properties of light-Spectrum of light-Visible light and the eye- Fechner's Law-Weber's law - Measurement of light-Radiometry-Photometry-Laws of reflection and refraction-Total internal reflection-The Ray model-Fermat's principle

Module 2 LENSES AND INTERFERENCE

Introduction: Lenses-Spherical lens-Cylindrical lens-Contact lens -Divergence and convergence of wave fronts by spherical surfaces Interference phenomena in optics-Constructive interference-Destructive interference Coherence-Spatial coherence-Temporal coherence - Applications of interference-Thomas Young's experiment -Interference in thin films- Wedge shaped thin films-Newton's rings experiment-refractive index of liquid.

Module 3 DIFFRACTION AND POLARISATION

Phenomenon of Rectilinear Propagation -Frenel's diffraction-Fraunhofer diffraction-Applied aspects of diffraction-Single slit, qualitative and quantitative-Zone plate-Circular aperture-Polarization of transverse waves-light as transverse waves Double refraction-Nicol prism - Nicol prism as an analyser -Elliptically & Circularly polarized light-Optical activity- Frenal's experiment-Biquartz-Applications of polarized light

Module 4 SPECTRUM AND SCATTERING

Sources of spectrum: Bunsen-carbon-mercury-sodium-Emission and absorption spectra
Classification of emission spectra-Solar spectrum-Ultraviolet Spectrum-Infra red spectrum-Electromagnetic spectrum-Applied aspects-Glare effect-light reduction effect

Photo electric effect-Raman Effect-LASER

Module 5 OPTICAL INSTRUMENTS

Spectrometer-Simple and compound microscope-Telescope-Resolving power of optical instruments-Resolving power of the eye-Magnifying power of simple and compound microscope, telescope- Interferometer-Michelson interferometer-Fabry-Perot interferometer

Text Books

1. Optics: Eugene Hecht and A. R. Ganesan, Dorling Kindersely (India) (2008)
2. Optics: A. K. Ghatak, Tata McGraw Hill, (2008)
3. N.Subramanyam, Brij Lal and Dr.M.N.Avadhanulu: A text book of Optics, S.Chand & Co. (2019)

Reference Books

1. The Principles of Physical Optics: An Historical and Philosophical Treatment Charles A. Bennett, Wiley, (2008)
2. Physical Optics: Concepts, Optical Elements, and Techniques, Giovanni Giusfredi (2019)
3. Optical Physics Textbook by Ariel Lipson, Henry Lipson, and S. G Lipson (2010)
4. Principles of Physical Optics, Charles A. Bennett, Wiley, (2008)

20OP2002 GENERAL ANATOMY AND GENERAL PHYSIOLOGY

Credits 3:0:0

Course objective

1. To explain the basics on the structure of human anatomy
2. To illustrate the different systems of the body and their functioning
3. To demonstrate the functions of respiratory and endocrine glands

Course Outcome

At the end of the course, the student will able to

1. Give outline on cells, their functions and membrane transportation of cells.
2. Explain the composition of blood and its function on maintaining homeostasis.
3. Demonstrate the components of respiratory and cardiovascular systems.
4. Describe about the anatomical locations, structures and their physiological functions.
5. Illustrate the structure and functions of nervous system and parts of brain.
6. Explain about the structure of eye, ear and kidney and their functions.

Module 1 SYSTEMIC ANATOMY

Subdivisions of Anatomy: Regional and Systemic Anatomy-Planes of the Body-Terminology-Skeletal System-Bones of the body-Joints – Classification, Joints of the body-Muscular system-Cardiovascular System- Heart, Arteries & Veins of the Body -Lymphatic system – Lymphoid organs, Lymphatics & Lymphatic drainage of the body-Respiratory system – Upper and lower Respiratory tract, Lungs, Pluera& Muscles of Respiration-Digestive system-Reproductive system-Endocrine system-Special senses – Ear, Tongue and Nose

Module 2 HISTOLOGY

Ephithelial Tissue-Connective Tissue-Cartilage-Bone-Muscular Tissue-Cardiovascular Tissue-Lymphoid organs-Nervous System-Skin & Appendages-Exocrine glands – Salivary, Lacrimal, Mammary & Pancreas-Endocrine glands – Thyroid, Parathyroid, Pituitary & Adrenal-Eye – Cornea & Retina

Module 3 PHYSIOLOGY, BLOOD AND CARDIOVASCULAR SYSTEM

Cell structure, Body fluid compartments, Transport across cell membrane, Homeostasis,
Skeletal muscle structure and properties, neuromuscular junction and muscle contraction - Composition and function of Blood, Red blood cells, erythropoisis, anaemia, White blood cells structure and functions, Platelets and blood coagulation, plasma proteins, blood groups-Properties of cardiac muscle, origin and conduction of heart beat, cardiac cycle, ECG, cardiac output, arterial blood pressure measurement, factors affecting and factor regulating it, heart rate and its regulation

Module 4 RESPIRATION, DIGESTIVE SYSTEM AND EXCRETION

Mechanics of respiration, lung volume and capacities, transport of oxygen and carbondioxide, regulation of respiration, hypoxia and artificial respiration, Movements of GI tract, Secretions and functions of salivary glands, gastric glands, pancreas, small intestine, function of liver, absorption in the intestine - Structure of Nephron, Renal circulation, formation of urine, micturition, diuretics, normal and abnormal constituents of urine, structure and function of skin

Module 5 ENDOCRINE, REPRODUCTIVE NERVOUS SYSTEM AND SPECIAL TISSUES

All major endocrine glands, their secretion, action and regulation with hyper and hypo secretion of the glands. Spermatogenesis, male sex hormones, menstrual cycle, pregnancy and lactation, principles of contraceptive methods Structure of neuron, properties of nerve, nerve impulse conduction, synapse, receptor, spinal cord, reflex action, ascending and descending tracts, structure and function of cerebral cortex, basal ganglia, thalamus, hypothalamus, brain stem, sleep and reticular formation, autonomic nervous system - Olfaction, gustation, Hearing and Vision-Structure, Physiology, pathways and applied aspect

Text Book

1. Textbook of Human Histology with Colour Atlas, Inderbir Singh, 4th Edn., 2011

Reference Books

1. G.J.Tortora & N.P.Anagnostakos: Principles of Anatomy and Physiology by Bryan H Derrickson, Wiley 2017
2. Donald C.Rizzo, Fundamentals of Anatomy and Physiology, 2016

20OP2003 PRINCIPLES OF LIGHTING

Credits 3:0:0

Course Objective

1. To impart knowledge about modern theory on light and colour
2. To demonstrate different types of light sources and illumination.
3. To illustrate concepts of lighting systems and fiber optics technology.

Course Outcome

At the end of the course, the student will able to

1. Identify the basics concept of colour theory and light.
2. learn the different kinds of sources of light sources.
3. Demonstrate the illumination principles and its parameters.
4. Design lighting systems for optometric purposes.
5. Experiment with different types of lighting
6. Apply fiber optics technology in modern optical instruments.

Module 1 MODERN THEORY ON LIGHT AND COLOUR THEORY

Synthesis of light-Colour theory: Additive and subtractive synthesis of colour- Goethe's theory 7 reasoning-colour temperature-colour rendering-Factors affecting visual tasks

Module 2 LIGHT VISION AND SOURCES

Light and vision: Discomfort glare-Visual ability-relationship among lighting-visibility and task performance-Light sources: Sunlight-Modern light sources-spectral energy distribution-luminous efficiency-colour temperature-colour rendering.

Module 3 ILLUMINATION

Illumination: Luminous flux-candela-solid angle-illumination-utilization factor-depreciation factor-Illumination laws

Module 4 LIGHTING SYSTEM DESIGN

Lighting System Design: Design approach-Design process-concept of lighting design-Physical consideration and psychological consideration and types of lighting

Module 5 PHOTOMETRY AND FIBRE OPTICS

Photometry : Photometric quantities-photometers and filters-Fibre optics: Optical description-optical fiber communication -optical fibre cables.

Text Book

1. Colour: An introduction to practice and principles

Reference Books

1. Colour: An introduction to practice and principles
2. Applied Illumination Engineering-Lindsey
3. Illuminating Engineering Society of North America Introductory Lighting, 1985

20OP2004 BASIC BIOCHEMISTRY

Credits 3:0:0

Course Objective

1. To demonstrate structure, properties and function of various biomolecules.
2. To throw light on the basic structure of biomolecules in metabolic pathways.
3. To provide the knowledge on the significance of these biomolecules.

Course Outcome

At the end of the course, the student will be able to

1. Acquire knowledge on structure, properties and biological functions of carbohydrates, lipids and proteins.
2. Acquire knowledge on nucleic acids structure, properties and functions of nucleic acids
3. Assess the significance of Vitamins and mineral functions.
4. Analyze the biomolecules and relate them with the scope of biotechnology.
5. Justify the clinical and biological significance of biomolecules.
6. Apply the photometric techniques in clinical optometry.

Module 1 CARBOHYDRATES AND PROTEINS

Properties of monosaccharide, disaccharides, polysaccharides and their biological importance Classification and properties of Amino acids, physiological important peptides, Classification and properties of proteins, plasma proteins, structure of protein, immunoglobulins, chromatography and electrophoresis

Module 2 LIPIDS AND ENZYMES

Classification and properties of fatty acids, triglycerides, phospholipids, other compound lipids, cholesterol its derivatives and their biological significance
Definition, classification, co-enzymes, factors affecting their action, enzyme inhibition, enzymes of clinical importance

Module 3 VITAMINS AND MINERALS

Classification, functions, source, deficiency manifestations and hypervitaminoses.
Calcium, Phosphorus, Sodium, Potassium, iron, selenium, iodine, copper.

Module 4 HORMONES, METABOLISM AND OCULAR BIOCHEMISTRY

Hormones basic concepts in metabolic regulation with examples, with respect to insulin
Metabolism of carbohydrates, proteins and lipids-Various aspects of the eye, viz., tears, cornea, lens, aqueous, vitreous, retina and pigment rhodopsin.

Module 5 TECHNIQUES AND CLINICAL BIOCHEMISTRY

Importance of the biochemical constituents in ocular tissues
Colloidal state, sol. Gel, emulsion, dialysis, electrophoresis, Ph buffers mode of buffer action, molar and percentage solutions, photometer, colorimetry and spectrophotometry
Radio isotopes: application in medicine and basic research-Blood sugar, urea, creatinine and bilirubin significance of their estimation

Text book:

1. Dr.S.Ramakrishnan: Essentials of Biochemistry & Ocular Biochemistry 1992, Publications Division, Annamalai University. (EBO)

Reference Books:

1. G.Rajagopal & Dr.S.Ramakrishnan: Practical Biochemistry for Medical students, M/s. Orient Longman, Calcutta, 1985 (For Practical)

20OP2005 PHYSICAL AND GEOMETRICAL OPTICS LAB

Credits 0:0:2

Course Objective

1. To train the students on Optics experiments to understand the basic concepts.
2. To learn about the light and diffraction phenomena using prism experiment
3. To study about the Interference experiments to understand the light phenomena

Course outcome

Students will have the ability to

1. Demonstrate the practical skills on measurements and instrumentation techniques through physics experiments.
2. Describe the concepts and principles of light through practical experiments
3. Analyze different measurements for effective understanding of the methods involved.
4. Describe the concepts and principles of light and its phenomena through practical experiments

5. Workout calculations, property analysis of optic measurements and to bring results
6. Apply the learned concepts for different applications related to optics

List of experiments

1. Newton's Ring's-radius of curvature-refractive index of lens
2. Newton's Ring's-refractive index of a liquid
3. Air wedge-thickness of a wire (hair)
4. Grating-wavelength determination
5. Dispersive power of a grating
6. Grating – minimum deviation & Wavelength determination
7. Fresnel's biprism experiment
8. Thickness of thin glass plate
9. Refraction through a slab
10. I-d curve for a prism – pin method
11. Spherometer and lens gauge
12. Single optic lever
13. Double optic lever
14. Critical angle – glass and water
15. Magnifying power of a simple and a compound microscope

The faculty conducting the Laboratory will prepare a list of 10 experiments and get the approval of HoD and notify it at the beginning of each semester.

20OP2006 PHYSICAL &GEOMETRIC OPTICS II

CREDITS :3:0:0

Course Objectives:

1. To impart knowledge on the stimulus vision, focal points and prism diopters
2. To demonstrate the equivalent dioptric power of thick meniscus lens and power in different meridians .
3. To illustrate the Depth of field and depth of focus, Aberrations measurements

Course Outcomes:

At the end of the course, the student will be able to

1. Understand the stimulus vision, spherical vision and focal points.
2. Interpret prism diopter laws, power, and magnification principles.
3. Demonstrate power manipulation in thick lenses with matrix theory.
4. Apply the cylindrical and sphero-cylindrical lenses, techniques to calculate the different meridians power
5. Appraise the motion of physical systems.
6. Understand the concept stops, pupils and ports on the optical systems to overcome the distortions

Module 1: Stimulus of vision

Laws of reflection and refraction Total internal reflection The Ray model Fermat's principle Refraction through spherical surfaces Introduction: Lenses-Spherical lens-Cylindrical lens-Contact lens -Divergence and convergence of wave fronts by spherical surfaces - Definition of diaptre -Vergence Working of spherical lenses – primary and secondary focal points

Module 2: Prism diopter:

Prentice's law – deviations- Opthalmic prisms – thin and thick Refraction at single Spherical or plane surfaces: convex – concave – Curvature & SagittaVergence & dioptric power-Nodal points & nodal ray-lateral magnification and angular magnicifaciton-Snell's law of refraction Thin lenses: lenses in contact-lenses separated by a distance. Two lens systems- dioptric & vergence power-(Object-image) relationships Application: calculation of image points - dioptric powers in reduced systems using vergence techniques

Module 3: Thick lenses

cardinal points - front and back vertex powers reduced system - dioptric power of equivalent lenses. Application – to calculate to the equivalent dioptric power of thick meniscus lens-plano convex vertex powers- position of principal planes- Dioptric powers using reduced systems. (Matrix theory and lens matrices)

Module 4:Cylindrical and spherocylindrical lenses

location of foci-image planes-principle meridiansrefraction by a cylindrical lens -calculation of power in different meridians -spherocylindrical lenses- circle of least confusion- refraction through a sphro cylindrical lens- writing Rx in different forms (+cyl., -cyl., meridional)-additional sphro-cylinders-oblique-cylinders

Module 5: Stops, Pupils and Ports:

Entrance pupil & exit pupil (size & location) Field stop Entrance port & exit port, field of view, vignetting Depth of field and depth of focus 4. Aberrations: Spherical Coma Oblique astigmatism Curvature of field Distortion Chromatic 5. Thin prisms and Mirrors Unit of measurement (prism diopter) Prism deviation in prism Combination of thin prisms Dispersive power of prism-achromatic prisms Planar & spherical reflection in mirrors Magnification in mirrors Lens/mirror systems

Reference Books:

1.Mirrors, Prisms & Lenses-southall, Dover
2.Geometric, Physical & Visual Optics-Michael P.Kealing
3.Aberrations of Optical systems-W.T.Welford Introduction to Geometrical optics-Milton
4. N.Subramanyam & Brij Lal: A text book of Optics, S.Chand & Co.

20OP2007 COMPUTING AND COMPUTER APPLICATIONS

CREDITS:3:0:0

Course Objectives:

1. To impart knowledge on the fundamentals of computer and its in terfaces.
2. To demonstrate the system hardware, software and the applications theroff for the clinical data maintenance.
3. To illustrate the office applications suit and programming for specific applications and object oriented programming.

Course Outcomes:

At the end of the course, the student will able to

1. Understand the history of computers and its characteristics.
2. Demonstrate the functions of different ports in hardware and software tools
3. Apply office applicate suite for programming specific applications.
4. Program in C language, and identifiy the Data types, identifiers, functions and its types, arrays, union, structures and pointers
5. Program for specific clinical data required for the history of individuals
6. Retrive the data for any specific conditions to process for further references and data processing.

Module 1. Computers:

History of computers, Definition of computers, input devices, output devices, storage devices, types of memory, and units of measurement, range of computers, generations of computers, characteristics of computers,.

Module 2. System:

Hardware, Software, system definition, Fundamentals of Networking, Internet, performing searches and working with search engines, types of software and its applications

Module 3. Office application suite

Word processor, spreadsheet, presentations, other utility tools, Fundamentals of Linux / Windows operating system, functions, interfaces, basic commands, working with the shell and other standard utilities. Language - Comparison chart of conventional language, programming languages, generations of programming languages, Compilers and interpreters, Universal programming constructs based on SDLC, Variable, constant, identifiers, functions, procedures, if while, do – while, for and other Structures.

Module 4 : Programming

Programming in C language, Data types, identifiers, functions and its types, arrays, union, structures and pointers

Module 5:Introduction to object oriented programming

c++: classes, objects, inheritance polymorphism, and encapsulation. Introduction to databases, and query languages, Introduction to Bioinformatics

Reference Books

1. C Programming Tutorial (K & R version 4) Author(s): Mark Burgess
2. An introduction to GCC by Brain J.Gough, foreword by Richard M.Stallman
3. Red Hat Linux 9 bible by Christopher Negus May 2003
4. Microsoft office 2003 by Jennifer Ackerman Kettell, Guy Hart-Davis

20OP2008 NUTRITION

CREDITS:3:0:0

Course Objectives:

1. To impart knowledge on the Nutrition, balanced diet and menu planning.
2. To demonstrate the role of Protein Sources and functions, Essential and non-essential amino acids, Incomplete and complete proteins, and Supplementary food
3. To illustrate the fundamental Measurement and energy value of food.

Course Outcomes:

At the end of the course, the student will able to

1. Understand the importance of balanced food and food groups.
2. Classify the carbohydrates, Fats and proteins and its presence in different sources.
3. Demonstrate the role of Macro and micro minerals associated with the eye defects
4. Measure the energy value of food, Energy expenditure,
5. Calculate the total energy/calorie requirement for different age groups and diseases .
6. Recommend suitable diet plan for a specific case related to different conditions of eye

Module 1: Introduction

History of nutrition, Nutrition as science 2. Foods Food groups, RDA, Food guides, Food Pyramid, Balanced diet, Limitations of daily food guide, Menu planning

Module 2

Carbohydrates Function, sources, RDA, Dietary fiber

Module 3

Proteins Sources and functions, Essential and non-essential amino acids, Incomplete and complete proteins, Supplementary food, PEM and the eye, Nitrogen balance, Changes in the protein requirement

Module 4

Fats Functions and sources, Essential fatty acids, Excess and deficiency, Lipids and the eye 6. Energy Units of energy, Measurement and energy value of food, Energy expenditure, Total energy/calorie requirement for different age groups and diseases, Energy imbalance – obesity, starvation

Module 5

Minerals General functions and sources, Macro and micro minerals associated with the eye, Deficiencies and excess – ophthalmic complications (e.g) Iron, calcium, Iodine, etc 8. Vitamins General functions, food sources, Vitamin deficiencies and associated eye disorders with particular emphasis on vitamin 'A' 9. Antioxidant Lutein, xeamanthin, lycopene, Monosodium Glutamate, aspartame and their role in vision

Reference Books:

1. Nutritional Opthalmology (Nutrition, Basic and Applied Science) by Donald Stewart MC Lenon, 2nd Ed. (1980)
2. Nutritional and environmental influences on the Eye, Allen Taylor (1999)
3. Nutritional Aspects and Clinical Management of Chronic Disorders and Disease (2002)
4. Normal and Therapeutic Nutrition, Orinne H. Robinson & Narilyn R. Lawler, 1986
5. Food & Nutrition, Dr. M.Swaminathan, Vol. I & II

20OP2010 HOSPITAL PROCEDURES LAB

Credits 0:0:3

Course Objectives:

1. To impart knowledge on the hospital procedures to coordinate with different departments.
2. To demonstrate the functioning of departments such as accounts, Bio medical, front office and records.
3. To illustrate the importance of patient history, human resource and message centre connecting all the departments.

Course Outcomes:

At the end of the course, the student will be able to

1. Understand the functioning of different departments and their role in running the hospital at ease.
2. Understand the front office procedures and data maintenance of hospital records.
3. Demonstrate the message centre connecting the departments for hassle free functioning of the hospitals.
4. Apply the computer programming knowledge in record maintenance and data retrieval for future reference.
5. Understand the data from different diagnostic tools such as angiography and so on.
6. Appraise the human resource and social work department to solve the human problems.

Practical:

1. Accounts Department
2. Laboratory
3. Bio-Medical Engineering department
4. Medical records Department

5. Correspondence
6. Stores
7. House Keeping
8. Reception
9. Computer Department
10. Fundus Fluorescein Angiography and Medical Photography
11. Human Resources Department
12. Medical Social Work Department
13. Message Centre
14. Patients Relation Department
15. Biometry Department

20OP2011COMPUTING AND COMPUTER APPLICATIONS LAB

CREDITS 0:0:3

Course Objectives:

1. To impart knowledge on the fundamentals of computer and its in terfaces.
2. To demonstrate the system hardware, software and the applications theroff for the clinical data maintenance.
3. To illustrate the office applications suit and programming for specific applications and object oriented programming.

Course Outcomes:

At the end of the course, the student will able to

1. Understand the history of computers and its characteristics.
2. Demonstrate the functions of different ports in hardware and software tools
3. Apply office applicate suite for programming specific applications.
4. Program in C language, and identifiy the Data types, identifiers, functions and its types, arrays, union, structures and pointers
5. Program for specific clinical data required for the history of individuals
6. Retrive the data for any specific conditions to process for further references and data processing.

Practicals:

1. Various browsers, search engines, email
2. Text document with mages with multiple formatting options using a specified office package
3. Spreadsheet using a specified office package
4. Presentation on a specified topic using the specified locations
5. Shell programming-parameters
6. Shell program- regular expressions
7. C program- functions
8. C program – file handling
9. C program demonstrating the usage of user defined variables
10. Databases
11. Applications in Optometry

20OP2012 Optometric Optics I

CREDITS 3:0:0

Course Objective

1. To impart knowledge on the types of optical lenses
2. To explain the various properties of optical lenses through physics concepts
3. To deliver knowledge on classification and properties of spectacle frames

Course Outcome

At the end of the course, the students will be able to

1. Recall the types of optical lenses
2. Understand the properties of optical lenses through laws of physics
3. Apply the knowledge on optical properties in lens manufacturing
4. Analyze the quality of lenses
5. Identify the type of spectacle frames
6. Appreciate the knowledge gained on optical lenses to solve vision problems

Module 1: Spectacle Lenses Part-1

Introduction to Spectacle Lenses: Forms of Lenses- Cylindrical and Spherocylindrical Lenses- Properties of Crossed Cylinders- Toric Lenses- Toric Transportation- Astigmatic Lenses- Axis Direction of Astigmatic Lenses- Obliquely Crossed Cylinders- Sag Formula- Miscellaneous Spectacle Lenses- Vertex Distance and Vertex Power- Tilt Induced Power- Aberrations in Ophthalmic Lenses- Fresnel Prisms- Lenses and Magnifiers.

Module 2: Spectacle lenses Part-2

Manufacture of Glass- Lens Surfacing- Principle of Surface Generation and Glass Cements.

Module 3: Lens Quality

Faults in Lens Material- Faults on Lens Surface- Inspecting the Quality of Lenses Toughened Lenses.

Module 4: Ophthalmic Lenses

Definition of Prisms- Units of Prism Power- Thickness Difference and Base – Apex Notation- Dividing- Compounding and Resolving Prisms- Rotary Prisms and Effective Prism Power in Near Vision-Prismatic Effect- Decentration-Prentice's Rule- Prismatic Effect of Spherocylinders and Plano Cylinders- Differential Prismatic Effects.

Module 5: Spectacle Frames

Frame Types and Parts Classification of Spectacle Frames – Material, Weight, Temple Position, Coloration; Frame Construction- Frame Measurements and Markings.

Reference Books:-

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

20OP20103 Ocular Diseases I

Credits 3:0:0

Course Objective

1. To impart a detailed knowledge on the anatomy of eyelids, lacrimal system, orbit, cornea , iris and pupil.
2. To explain the functioning of eyes.
3. To deliver knowledge on the different eye trauma associated with its anatomy.

Course Outcome

At the end of the course, the students will be able to

1. Recall the anatomy of eye.
2. Understand the functioning of eyes.
3. Apply the knowledge of eye anatomy in finding the eye tumors.
4. Analyze the quality of vision through eye anatomy.
5. Identify the type of eye tumor, Conjunctiva and Cornea
6. Appreciate the knowledge gained on eye anatomy in rectifying the problems in eye vision due to tumours and trauma.

Module 1: Eyelids

Eyelid Anatomy Congenital and Developmental Anomalies of the Eyelids-Blepharospasm – Ectropion-Entropion-Trichiasis and Symblepharon-Eyelid Inflammations-Eyelid Tumours-Ptosis- Eyelid Retraction -Eyelid Trauma.

Module 2: Lacrimal system

Lacrimal System-Lacrimal Pump Methods of Lacrimal Evaluation-Congenitial and Development Anomalies of the Lacrimal System-Lacrimal Obstruction-Lacrimal Sac Tumors -Lacrimal Trauma-Sclera-Episclera: Ectasia and Staphyloma Scleritis-Episcleritis.

Module 3: Orbit

Orbital Anatomy-Incidence of Orbital-Abnormalities-Methods of Orbital Examination-Congenital and Developmental Anomalies of the Orbit-Orbital Tumours-Orbital Inflammations-Sinus Disorders affecting the Orbit-Orbital Trauma.

Module 4: Conjunctiva and Cornea

Inflammation: Therapeutic Principles-Specific Inflammatory Diseases; Tumours: Tumours of Epithelial Origina-Glandular and Adnexal Tumours-Tumours of Neuroectodermal Origin - Vascular Tumours-Xanthomatuos Lesions-Inflammatory Lesions-Metastatic Tumours; Degenerations and Dystrophies: Definitions-Degenerations-Dynstrophies; Miscellaneous Conditions: Keratoconjuctivitis Sicca (K Sicca)-Tear Function Tests -Stevens – Johnson Syndrome -Ocular Rosacea-Atopic Eye Disorders-Benign Mucosal Pemphigoid (BMP) – Ocular Pemphigoid-Vitamin A Deficiency-Metabolic Diseases Associated With Corneal Charges

Module 5: Iris, Ciliary body and Pupil

Congenital anomalies-Primary and secondary disease of iris and ciliary body-Tumors - Anomalies of papillary reactions; Choroid: Congential anomalies of the choroids-Diseases of the choroid-Tumours

Reference Books:

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

20OP2014 VISUAL OPTICS I

Credits 3:0:0

Course Objective

1. To impart knowledge on the geometric optics for the betterment of eye vision.
2. To explain the functioning of eyes through ocular structures.
3. To deliver knowledge on the refractive anomalies and their causes.

Course Outcome

At the end of the course, the student will be able to

1. Recall the physical laws in geometric optics.
2. Understand the optics of ocular structures.
3. Apply the knowledge of optics in measurement of optical constants of the eye.
4. Analyze the quality of vision through eye anatomy.
5. Evaluate the refractive anomalies.
6. Appreciate the knowledge gained on visual optics in treatment of eye problems.

Module 1: Review of Geometric Optics

Vergence and Power- Conjugacy, Object Space and Image Space-Sign Convention- Spherical Refracting Surface -Spherical Mirror-Catoptric Power -Cardinal Points -Magnification

Module 2: Optics of Ocular Structures

Cornea and Aqueous-Crystalline Lens-Vitreous-Curvature of the Lens and Opthalmophakometry- Axial and Axis of the Eye

Module 3: Measurement of the Optical Constants of the Eye

Corneal Curvature and Thickness- Keratometry-Curvature of the Lens and Ophthalmophakometry-Axial and Axis of the Eye

Module 4: Refractive Anomalies and their Causes

Aeitology of Refractive Anomalies-Contributing Variabilities and their Ranges-Populating Distributions of Anomalies

Module 5 : Optical components

Optical Component Measurements -Growth of the Eye in Relation to Refractive Errors

Reference Books:

1. Bennett & Rabbetts: Clinical visual Optics 2. David O Michaels: Visual Optics & Refraction (DOM)

20OP2015 Ocular Anatomy and Ocular Physiology

Credits 3:0:0

Course Objective

1. To impart a detailed knowledge on the ocular physiology.
2. To explain the functioning of eyes through phenomena like torsion, deviation, muscle action etc.
3. To deliver knowledge on the crystalline lens and accommodation.

Course Outcome

At the end of the course, the student will be able to

1. Recall the working of eye lid, lacrimal apparatus and extra ocular muscles.
2. Understand the cornea aqueous secretion and dynamics.
3. Apply the knowledge of crystalline lens and accommodation for curing eye anomalies.
4. Analyze the quality of iris and pupil.
5. Evaluate the problems associated with retina and acuity of vision.
6. Appreciate the knowledge gained on ocular physiology in rectifying defects in colour vision.

Module 1: Eye lid, Lacrimal Apparatus & Extra-ocular muscles

Movements and Pathways; Lacrimal Apparatus : Tear Film & Composition of Tears-Tests to Assess Lacrimal Excretory Function; Extra-Ocular Muscles : Articulation of Eyeball in Socket - Mechanics of Movement-Control of Eye Movements-Diplopia-Diagnosis & Assessment-Qualification of Extra Ocular Muscle-Limitation: Measurement of Torsion-Measurement of Deviation- Measurement of Field of BSV- Measurement of Field of Muscle Action.

Module 2: Cornea- Aqueous secretion & dynamics

Biochemistry- Corneal Transparency- Innervations; Aqueous Humor & Vitreous: Aqueous Secretion & Dynamics- Maintenance of IOP- Diuranal Variations-Measurement of IOP-Molecular Structure of Vitreous & Developmental Anomalies.

Module 3: Crystalline lens & Accommodation:

Biochemistry- Glucose Metabolism- Changes in Lens Structure-Depth of Field & Depth of Focus- Accommodation: Changes- Amplitude- Accomadation & Refraction- Accomadation & Convergence- Presbyopia.

Module 4: Iris & pupil

Pupillary Reaction to Light -Measurement of Afferent Papillary Defect-Pharmacology of Pupil-Horner's Syndrome & Evaluation-Analyzing Anisocoria.

Module 5: Retina & Acuity of vision

Photichemistry of Retina-Wald's Visual Cycle-Entopic Phenomenon; Acuity of Vision: Vernier Acuity- Minimum Angle of Resolution- Principle of Measurement-Factors Affecting Visual Acuity; Visual Pathway: Optic Nerve, Chiasm & Optic Tract Visual Deprivation- Lesions of Pathway; Visual Perception: Binocular Vision- Development- Theories of Fusion- Stereoscopic

Acuity- Tests for Stereopsis- Anaomalies of Stereopsis- Dark Adaption; Colour Vision: Theories of Colour Vision- Defective Colour Vision- Testing for Congenital & Acquired Colour Vision Defects; Electrophysiology: Electro Retinogram- Electro Oculogram.

Reference Books:

1. Davson H: Physiology of the eye, 4th edition. 1980 2. Sir Steward Duke Elders, System of Ophthalmology, Vol.4

20OP2016 Pathology and Microbiology

Credits 3:0:0

Course Objective

1. To impart a detailed knowledge on diseases associated with eyes.
2. To explain the science of hematology.
3. To deliver knowledge on the cornea and retina with the associated pathology.

Course Outcome

At the end of the course, the student will be able to

1. Recall the diseases associated with eyes.
2. Understand the science of hematology.
3.Understanding the pathology of cataract.
4.Apply the knowledge of morphology of bacterial cell in testing the eyes.
5.Analyze the quality of vision through basic immunology studies.
6.Identify the type of eye tumor and treatment with a thorough knowledge on pathology and microbiology.

Module 1: General Introduction

Inflammation and Repair- Ophthalmic Wound Healing- Infections: Tuberculosis-Leprosy-Syphilis-Fungus-Virus-Chlamydia; Intraocular Tumours: Retinoblastoma-Choroidal Melanoma - Optic Nerve : Normal and Tumors.

Module 2: Hematology

Anemia, Leukemia and Bleeding Disorders-Clinical Pathology-Examination of Urine and Blood Smears; Eyelid: Normal and Pathology Including Inflammations and Tumors.

Module 3: Cornea & Retina

Normal and Pathology in Degeneration and Dystrophies; Lens: Normal and Pathology of Cataract; Retina: Normal and Pathology in Inflammatory Disease- Infections; Orbit: Inflammation and Neoplasia.

Module 4: Morphology of the bacterial cell

Growth and Nutrition of Bacteria- Cultivation Methods- Identification of Bacteria- Sterilization Disinfection- Antibacterial Agents and Antibiotic Sensitivity Testing.

Module 5: Basic Immunology

Bacterial Infections of the Eye-Viral Infections of the eye- Parasitic Infections of the Eye - Fungal Infections of the Eye.

Reference Books:

1. Corton Kumar and Robins: Pathological Basis of the Disease, 4th edition, 1994
2. Harsh Mohan: Text Book of Pathology
3. Burton G R W: Microbiology for the Health Sciences, St.Louis, J P Lippincott Co., 3rd ., 1988

4. Essentials of Medical Microbiology by Rajesh Bhatia, Rattan Lal Ichhpujani- Jaypee (latest edition)

20OP2017 Visual Optics Lab I

Credits 0:0:2

Course Objective

1. To provide practical skill set on visual optics
2. To give hands on training on experiments on lenses, prism etc.
3. To develop skill set on hypermetropia, emmetropia etc through mathematical models

Course Outcome

At the end of the course, the student will have the ability to

1. Understand the Purkinje images
2. Apply the knowledge on visual optics in measuring the corneal curvature and thickness
3. Appreciate the knowledge on mathematical models in eye emmetropia and hypermetropia
4. Solve problems on axial refractive hyperopia and myopia
5. Develop practical skills on lens systems and prism
6. Create new methods for testing eye vision through physics experiments

1. Study of Purkinje images I and II
2. Study of Purkinje images III and IV
3. Measurement of corneal curvature
4. Measurement of Corneal thickness
5. Mathematical models of the eye –emmetropia
6. Mathematical models of Hypermetropia
7. Mathematical models of myopia
8. Conjugate points – demonstration – worked examples
9. Axial and refractive hyperopia – worked examples
10. Axial and refractive myopia – worked examples
11. Visual acuity charts
12. Effect of lenses in front of the eye
13. Effect of prisms in front of the eye
14. Vision through pinhole, slit, filters, etc

Reference Books:

1. Bennett & Rabbetts: Clinical visual Optics 2. David O Michaels: Visual Optics & Refraction (DOM)

20OP2018 Clinics Lab I

Credits 0:0:2

Course Objective

1. To provide practical skill set on visual optics
2. To give hands on training on experiments on lenses, prism etc.
3. To develop skill set on hypermetropia, emmetropia etc through mathematical models

Course Outcome

At the end of the course, the student will have the ability to

1. Understand the case sheet
2. Apply the knowledge on clinical procedures in history taking
3. Appreciate the knowledge on lensometry through practical works
4. Solve problems on visual acuity
5. Develop practical tests for phorias and tropias
6. Create new methods for Opthalmoscopy

1. Case sheet
2. History taking
3. Lensometry
4. Visual acuity
5. Tests for phorias and tropias
6. External examination
7. Slit lamp examination
8. Drugs and method of application
9. Do's and don'ts – papillary dilatation
10. Direct Opthalmoscopy
11. Indirect Opthalmoscopy
12. Instrumentation
13. Patients selection
14. Keratometry reading
15. Refraction
16. Fluorescent pattern
17. Overrefraction
18. Fitting of hard lenses
19. Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition

The students are made to observe the internees initially, then gradually they are encouraged to work up a patient, and perform various examination techniques

20OP2019 OPTOMETRIC OPTICS II

Credits **3:0:0**

Course Objective:

1. To impart knowledge on the characteristics of tinted lenses
2. To illustrate the types of filters and coatings used in lenses
3. To demonstrate the mounting of lenses and its proper handling

Course Outcome:

At the end of the course, the student will be able to

1. Define the properties and characteristics of the tinted and protective lenses
2. Describe the different types of filters used in lenses with their merits
3. Examine the reflected images and ghost images from the spectacle lenses
4. Analyse the effect of anti reflective, anti fog and anti scratch coatings on the lenses
5. Appraise on the size, shape and mounting of the lenses
6. Design and develop flawless, purpose solving spectacle lenses suitable for the patients

Module 1: TINTED LENSES

Tinted and Protective Lenses - Characteristics of Tinted Lenses - Absorptive Glasses.

Module 2: FILTERS AND OTHER LENSES

Polarizing Filters - Photochromic Filters - Reflecting Filters - Bifocal Lenses - Trifocal Lenses – Progressive Addition Lenses - Lenticular Lenses.

Module 3: IMAGES FROM LENSES

Reflections from Spectacle Lenses - Ghost Images - Reflections in Bifocals at the Dividing Line.

Module 4: COATING OF LENSES

Anti-reflection Coating – Anti Scratch Coating - Anti-fog Coating - Mirror Coating - Edge Coating - Hard Multi Coating (HMC).

Module 5: LENSES HANDLING

Field of View of Lenses - Size, Shape and Mounting of Ophthalmic Lenses - Aspherical Lenses.

Text Books:

1. M. Jalie: Principles of Ophthalmic Lenses, Edition 5, 2016
2. T. E. Fannin & T Grosvenor: Clinical Optics, 1996

Reference Books:

1. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999.
2. C.V. Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996.
3. P.C. Mukherjee: Optics For Optometry Students, JPB; First edition, 2009.

20OP2020 OCULAR DISEASES II

Credits **3:0:0**

Course Objective:

1. To provide a better understanding of ophthalmology, with reference to ocular diseases
2. To disseminate the knowledge on inflammation and complication caused in the vitreous body
3. To impart knowledge on the anterior and posterior segment trauma and blindness

Course Outcome:

At the end of the course, the student will be able to

1. List the abnormalities, trauma and inflammation related to vitreous body
2. Discuss in detail about the retinal disorder and related diseases
3. Interpret on the background, defects and techniques involved in neuro-ophthalmology
4. Illustrate clearly on the supranuclear control of eye movements
5. Appraise on the anatomy, pathophysiology and aging process
6. Analyze on the causes, therapy and drug related to ocular diseases

Module 1: VITREOUS

Developmental Abnormalities - Hereditary Hyaloidoretinopathies - Juvenile Retinoschisis - Asteroid Hyalosis – Cholesterolosis - Vitreous Haemorrhage - Blunt Trauma and the Vitreous - Inflammation and the Vitreous - Parasitic Infestations - Pigment Granules in the Vitreous - Vitreous Complications in Cataract Surgery.

Module 2: RETINA

Retinal Vascular Diseases - Diseases of the Choroidal Vasculature - Bruch's Membrane and Retinal Pigment Epithelium (RPE) - Retinal Tumors – Retinoblastoma – Phakomatoses - Retinal Vascular Anomalies - Retinal and Optic Nerve Head Astocytomas - Lymphoid Tumors - Tumors of the Retinal Pigment Epithelium - 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 Degenerations - Retinal Holes and Detachments - Intraocular Foreign Bodies – Photocoagulation.

Module 3: NEURO-OPHTHALMOLOGY

Neuro-Ophthalmic Examination – History - Visual Function Testing - Technique of Papillary Examination - Ocular Motility - Checklist for Testing - Visual Sensory System - The Retina - The Optic Disc - The Optic Nerve - The Optic Chiasm -The Optic Tracts -The Lateral Geneculate Body - The Optic Radiations -The Visual Cortex -The Visual Field - The Blood Supply of the Anterior and Posterior Visual Systems - Disorders of Visual Integration - Ocular Motor System - Supranuclear Control of Eye Movements: Saccadic System, Clinical Disorders of the Saccadic System, Gaze Palsies, Progressive Supranuclear Palsy, Parkinson's Disease, Ocular Motor Apraxia, Ocular Oscillation - Smooth Pursuit System and Disorders - Vergence System - Cerebella System - Non-Visual Reflex System - Position Maintenance System – Nystagmus - Ocular Motor Nerves and Medial Longitudinal Fascicules - The Facial Nerve - Pain and Sensation from the Eye - Autonomic Nervous System - Selected Systemic Disorders with Neuro-Ophthalmologic Signs.

Module 4: LENS

Anatomy and Pathophysiology - Normal Anatomy and Aging Process - Developmental Defects - Acquired Lenticular Defects.

Module 5: TRAUMA AND BLINDNESS

Anterior Segment Trauma - Posterior Segment Trauma – Blindness: Definitions – Causes - Social Implications - Rationale in Therapy - Drug Induced Ocular Diseases.

Text Books:

1. J. Kanski: Clinical Ophthalmology Elsevier; Ninth edition 2019.

Reference Books:

1. K. Dadapeer, Essentials of Ophthalmology Jaypee Brothers Medical Publishers; first edition 2015.
2. Deepak Mishra, Prashant Bhushan, M.K. Singh,Essentials in Ophthalmology,Elsevier, First edition 2018.

20OP2021 VISUAL OPTICS II

Credits **3:0:0**

Course Objective:

1. To provide knowledge on the basics of refractive conditions and visual defects
2. To get familiarized on the principles and method involved in retinoscopy
3. To acquire knowledge on the procedures related to spectacle correction

Course Outcome:

At the end of the course, the student will be able to

1. Understand the different types of defects associated with vision
2. Recognize various refractive conditions and relate both accommodation and convergence
3. Review on the methods and optimum conditions such as static and dynamic of retinoscopy
4. Compare the objective and subjective refractive methods along with other methods for astigmatism
5. Interpret on the astigmatic test and difficulties in objective tests
6. Analyze and correct the defects that are connected to the spectacles

Module 1: VISUAL DEFECTS

Emmetropia – Myopia – Hyperopia – Astigmatism - Anisometropia and Anisekonia – Presbyopia - Aphakia and Pseudo Aphakia - Correction and Management of Ambiopia.

Module 2: REFRACTIVE CONDITIONS

Far and Near Points of Accommodation - Correction of Spherical Ametropis - Axial Versus Refractive Ametropia - Relationship between Accommodation and Convergence - A/C Ratio.

Module 3: RETINOSCOPY

Retinoscopy – Principles and Methods - Retinoscopy – Speed of Reflex and Optimum Condition – Retinoscopy: Dynamic/Static.

Module 4: REFRACTIVE METHODSAND TESTS

Review of Objective Refractive Methods - Review of Subjective Refractive Methods - Cross Cylinder Method for Astigmatism - Astigmatic Fan Test - Difficulties in Objective Tests and their Avoidance - Transposition of Lenses - Spherical Equivalent - Prescribing Prisms - Binocular Refraction.

Module 5: SPECTACLE CORRECTION

Effective Power of Spectacles; Vertex Distance Effects - 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.

Text Books:

1. D. Abrams: Duke elders Practice of Refraction, Edition 9, 1998

Reference Books:

1. A. K. Khurana, Theory and Practice of Optics & Refraction, Elsevier India; 4 edition (2016)
2. L. P. Agarwal: Principles of Optics and Refraction, CBS; 5 edition (2019)

20OP2022 OPTOMETRIC INSTRUMENTATIONS

Credits **3:0:0**

Course Objective

1. To illustrate the basic principles, features, merits and demerits of different refractive instruments
2. To impart knowledge on the design and usage of ophthalmoscopes and other related devices.
3. To demonstrate various orthoptic and ophthalmic instruments and screening devices.

Course outcome:

At the end of the course, the student will be able to

1. Understand the various topics related to refractive instruments

2. Discuss about the design, features and advantages of ophthalmoscope and related devices
3. Illustrate on the principles, types and uses of tonometers
4. Interpret the techniques involved in fundus camera
5. Utilize the orthoptic and ophthalmic instruments for ultrasonography and electrodiagnostics
6. Appraise on the results of various vision testing and screening devices

Module 1: REFRACTIVE INSTRUMENTS

Test Chart Standards - Choice of Test Charts - Trial Case Lenses – Best Forms - Refractor (Phoropter) Head Units –Auto Refractors - Optical Considerations of Refractor Units - Trial Frame Design - Near Vision Difficulties with Units and Trail Frame - Retinoscope – Types Available - Adjustment of Retinoscopes – Special Features - Cylinder Retinoscopy - The Interpretation of Objective Findings - Special Subjective Test – Polarizing and Displacement – Simultan Test - Projection Charts - Illumination of the Consulting Room - Special Instruments: Brightness Acuity Test, Vision Analyzer, Pupilometer, Video Acuity Test, Nerve Fiber Analyzer - Binocular Vision - Simple and Compound Microscope **–** Oil Immersion Eyepiece.

Module 2: OPHTHALMOSCOPES AND RELATED DEVICES

Design of Ophthalmoscopes – Illumination/Viewing - Ophthalmoscope Disc - Filters for Ophthalmoscopy - Indirect Opthalmloscopes - The Use of the Ophthalmoscope in Special Cases - Lensometer: Lens Gauge or Clock - Slit Lamp - Slit Lamp Systems - Viewing Microscope Systems - Scanning Laser Devices - Slit Lamp Accessories - Mechanical Design in Instruments.

Module 3: TONOMETER AND FUNDUS CAMERA

Tonometer Principles - Types of Tonometers and Standardization - Use and Interpretation of Tonometers - The Fundus Camera: Principles, Techniques - External Eye Photography – Apparatus - Keratometer and Corneal Topography – Refractionometer.

Module 4: ORTHOPTIC AND OPHTHALMIC INSTRUMENTS

Orthoptic Instruments: Haploscopes, Home Devices, Pleoptics – Historical Instruments-OphthalmicUltrasonography:
Biometry/Ultrasound/'A'Scan/'B'Scan/UBM – Electrodiagnostics: ERG/VEP//EOG – NFA.

Module 5: VISION TESTING AND SCREENING DEVICES

Colour Vision Testing Devices: Colour Confusion, Hue Discrimination, Colour Matching - FM-100 Hue Test - Fields of Vision and Screening Devices:Perimeter and the Visual Field, Illumination of Field Testing Instruments, Projection Perimeters, Screening Devices for Field Defects, Results of Field Examination, Vision Screeners – Principles and Details, Analysis of Screener Results, Bowl Perimeters, Goldmann and Humphery Vision Analyzer - Optical Devices and Electronic (Low Vision) Aids.

Text Books:

1. David B Henson: Optometric Instrumentation, Butterworth-Heinemann Ltd (1 December 1982).

20OP2023 OPTOMETRIC INSTRUMENTATION LAB

Credits 0:0:3

Course Objective

1. To train the students on optometric experiments so as to understand the basic concepts.
2. To impart skills on handling refractive instruments
3. To provide knowledge on testing and screening devices

Course outcome

Students will have the ability to

1. Demonstrate the practical skills on optometric instrumentation with the aid of physics experiments
2. Describe the concepts and principles of refraction of light through refractive instruments
3. Interpret the results of various testing and scanning devices.
4. Illustrate on the photography of fundus camera through practical experiment
5. Carry out the associated test based on the ophthalmoscopes and other related devices
6. Utilize the orthoptic and ophthalmic instruments for electrodiagnostics

List of Experiments

1. Simple and compound microscope – oil immersion eyepiece

2. Refractive instruments: Test chart standards Trial case lenses – best forms Refractor (phoropter) head units –Auto refractors Retinoscope – types available Nerve fiber analyzer
3. Ophthalmoscopes and related devices Design of ophthalmoscopes – illumination/viewing Ophthalmoscope disc Filters for ophthalmoscopy Indirect ophthalmloscopesThe use of the ophthalmoscope in special cases
4. Lensometer, lens gauge or clock
5. Slit lamp Slit lamp systems Viewing microscope systems Scanning laser devices Slit lamp accessories
6. Tonometer: Tonometer principles
7. Fundus camera
8. Keratometer and corneal topography
9. Orthoptic Instruments
10. Colour vision testing devices
11. Fields of vision and screening devices
12. Ophthalmic Ultrasonography
13. Electrodiagnostics

20OP2024 VISUAL OPTICS LAB II

Credits **0:0:3**

Course Objective

1. To impart practical knowledge on visual optics through experiments
2. To provide practical knowledge about the defects involved in vision
3. To provide basic skill in identifying the type of visual defect

Course outcome

Students will have the ability to

1. Identify the myopia defect and thereby do the myopic corrections
2. Resolve hypermetropic correction and perform subjective verification
3. Use slit and Kertometry instrument to demonstrate astigmatism.
4. Review through experiments on the far and near points of accommodation
5. Classify the axial and refractive ametropia by doing the experiments
6. Analyze different measurements for effective understanding of the methods involved.

List of Experiments

1. Phorometry
2. Visual acuity, stereo acuity in emmetropis
3. Myopia and pseudomyopia, myopia and visual acuity
4. Myopic correction – subjective verification – monocular and binocular
5. Hypermetropia – determination of manifest error subjectively
6. Hypermetropic correction: subjective verification
7. Demonstration of astigmatism. Use of slit and Kertometry to find the principal meridians
8. Astigmatism: fan – subjective verification tests
9. Astigmatism: Cross-Cyl. – Subjective verification test
10. Measurement of accommodation: near and far points and range
11. Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid test
12. Methods of differentiating axial and refractive ametropia
13. Practice of Retinoscopy – Emmetropia
14. Practice of Retinoscopy – Spherical ametropia
15. Practice of Retinoscopy – Simple astigmatism
16. Practice of Retinoscopy – Compound hyperopia
17. Practice of Retinoscopy – Compound myopia
18. Practice of Retinoscopy – Oblique astigmatism
19. Practice of Retinoscopy – in media apacities
20. Practice of Retinoscopy – in irregular astigmatism
21. Practice of Retinoscopy – in strabismus and eccentric fixation
22. Interpretation of cycloplegic retinoscopic findings
23. Prescription writing
24. Binocular refraction
25. Photo refraction
26. Vision therapy
27. Exercises for vergence

20OP2025 CLINICS II 0:0:3

Course Objective

To enable students to acquire the clinical skills necessary for entry into the pre-registration year following graduation

Course Outcomes

The students will have ability to

1. To demonstrate clinical understanding in all of the clinics covered in the unit

2. To demonstrate practical clinical competence in each of the areas covered by the unit

3. To develop effective clinical communication skills.

4. To demonstrate the instrumentation used in lens fitting.

5. To demonstrate the refraction and refractive errors in eye.

6. To demonstrate the contact lens fitting

List of Experiments

1. Case Sheet
2. History Taking
3. Lensometry
4. Visual Acuity
5. Tests for Phorias and Tropias
6. External Examination
7. Slit Lamp Examination
8. Drugs And Method of Application
9. Do's and Don'ts – Papillary Dilatation
10. Direct Opthalmoscopy
11. Indirect Opthalmoscopy
12. Instrumentation
13. Patients Selection
14. Keratometry Reading
15. Refraction
16. Fluorescent Pattern
17. Over Refraction
18. Fitting of Hard Lenses
19. Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition. The students are made to observe the internees initially, then gradually they are encouraged to work up a patient, and perform various examination techniques.

20OP2026 Clinical Examination of Visual System

Credits: 3:0:0

Course Objective:

1. To impart knowledge on Ocular symptoms, testing and ophthalmic examination
2. To illustrate the concept of ophthalmoscopy and fundus
3. To provide knowledge on lacrimal and macular examinations

Course Outcome:

At the end of the course student will be able to

1. Understand the basics of Ophthalmic subject, symptoms and testing in visual system.
2. Examine various steps involved in Ophthalmic treatment
3. Illustrate the different types of lens examination and diagnosis
4. Describe Ophthalmoscopy and its different types of treatment methods.
5. Appraise the concepts of Fundus and Lacrimal examinations
6. Demonstrate the macular functioning and testing in ophthalmological examination

Module 1: Introduction

History of the Ophthalmic subject - Ocular symptoms- The past prescription – its influence - Visual acuity testing – distance and near and colour vision -

Module 2: Ophthalmic Examinations

Examination of muscle balance - Slit lamp examination - Examination of eye lids, conjunctiva and sclera - Examination of cornea - Examination of iris - ciliary body and pupil

Module 3: Lens and ophthalmoscopy

Examination of lens - Examination of intraocular pressure and examination of angle of anterior chamber -Ophthalmoscopy – Direct and Indirect

Module 4: Fundus and Lacrimal examinations

Examination of fundus - vitreous and disc - choroids and retina - Examination of lacrimal system - Examination of the orbit.

Module 5: Macular Examination

Macular function test - Visual field charting – central and peripheral - Neuro – ophthalmological examination

Textbooks: -

1. Jack J. Kanski: Clinical Ophthalmology, Butter-worths, 2nd Ed, 1989

Reference Books: -

1. Clinical Examination in Ophthalmology, Dr. Mukherjee P. K, ISBN: 9788131244630, 9788131244630

2. Clinical Methods in Ophthalmology: A Practical Manual for Medical Students, Dadapeer K, Jaypee Brothers Medical Publishers, January 2015, ISBN 9789351529071

20OP2027 Clinical Psychology

Credits: 3:0:0

Course Objective:

1. To impart knowledge on clinical psychology and the ideas of Sensation and Determinants
2. To illustrate the human psychology factors and methodologies involved in counselling therapy
3. To provide knowledge on the psychological reaction of patients and rehabilitation.

Course Outcome:

At the end of the course student will be able to

1. Understand the basics of clinical psychology and its various methods.
2. Analyze the various steps involved in the sensation process and determinants.
3. Illustrate the factors involved in human psychology and personality integration
4. Appraise various steps in counselling therapy in clinical psychology.
5. Describe the types of psychological reaction in patients with disability
6. Identify the disability and to allow the patients through rehabilitation process.

Module 1: Psychology

Introduction to Psychology - Definition, History, Branches, Scope and Current Status - Methods, Concepts of Normality and abnormality

Module 2: Sensation and Determinants

Sensation, Attention and Perception - Primary senses - Types of attention and determinants Principles of perception and determinants

Module 3: Human Psychology Factors

A – Intelligence, B - Learning, C - Memory, D - Personality, E – Motivation and F – Body image and personality integration

Module 4: Counseling therapy

Helper – Helpee relationship and Ophthalmic counseling - Characteristics of therapist - Relationship between the therapist and client - Counseling patient with partial sight, colour blindness and hereditary vision defects

Module 5: Reaction and Rehabilitation

Psychological Reaction- A – Illness, loss and Grief - B - Adapting changes in Vision (age, diseases, etc….) - Tests for people with disability- WAIS – R, WISC –R (for visually handicapped)- Blind learning aptitude tests - 7. Disability and Rehabilitation

Textbooks: -

1. Introduction to Psychology, Morgon C.T., King R.A., Robinson N.M., Tata Mc Graw Hill Publishing Co

Reference Books: -

1. Introduction to Psychology, Hilgard and Atkinson, Tata Mc Graw Hill Publishing Co. Psychology 5th Ed. Dworetsky J.P.

2. Child Development Hurlock, EB, VIED, Mc Graw Hill International Book Co. (1981)

20OP2029 LOW VISION AIDS

Credits: 3:0:0

Course Objective:

1. To provide knowledge the concepts of low vision diagnosis and its evaluation in demonstrating aids.
2. To impart knowledge on the need for teaching and guiding the patients with low vision
3. To illustrate the testing the methods of low vision, lens and devices for rehabilitation.

Course Outcome:

At the end of the course student will be able to

1. Identify the diagnostic procedures in low vision patients and case management
2. Analyze the evaluation techniques and demonstrating aids in low vision diagnosis
3. Illustrate the need for taking care of the patients with teaching and guidance
4. Demonstrate the use of telescopes and microscopes in low vision tests.
5. Describe the pathological conditions and to administer the patients with low vision care.
6. Identify the right optical devices for the rehabilitation of the visually handicapped.

Module 1: Low Vision Introduction

Identifying the low vision patient - History - Diagnostic procedures in low vision case management - Optics of low vision aids

Module 2: Evaluation and Demonstrating aids

Refraction, special charts - Radical retinoscopy - Evaluating near vision: Amsier grid and field defects, prismatic scanning - Demonstrating aids – optical, Non-optical, Electronic

Module 3: Teaching and Guidance

Teaching the patient to use aids including eccentric viewing training when necessary - Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near

Module 4: Low Vision Tests

Spectacle mounted telescopes and microscopes - Children with low vision - Choice of tests, aids in different pathological conditions - Light, glare and contrast in low vision care and rehabilitation

Module 5: Lens and Devices

Bioptic telescopes - Optical devices to help people with field defects - Contact lens combined system - Rehabilitation of the Visually handicapped

Textbooks: -

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

Reference Books: -

1. Low Vision AIDS Practice, 2nd Edition 2007, Bhootra Ajay, ISBN: 9788184480436, 9788184480436

20OP2030 Dispensing Optics

Credits: 3:0:0

Course Objective:

1. To demonstrate the verification and dispensing of ophthalmic materials and special practices in clinics
2. To impart the knowledge on the lens standards for the usage in the dispensing instruments
3. To illustrate the design and selection of frames for the optics and safety wear

Course Outcome:

At the end of the course student will be able to

1. Describe the ophthalmic materials in dispensing optics and its verification

2. Explain the special practices in handling the lenses and frames
3. Illustrate the procedures and process involved in the manufacturing of lenses.
4. Demonstrate the use of dispensing instruments in lens measurements and frame fittings.
5. Analyze various factors involved in the instrumentation for the selection of lenses.
6. Identify and select the right frame designs and fittings for the patients.

Module 1: Verification and Dispensing

Clinical experiences in verification and dispensing of ophthalmic materials outlined in Ophthalmic Optics (Optometric Optics Course) and Dispensing Optics

Module 2: Special Practices

Special practical instructions in centering, marking and mounting the lenses of all designs, types, shapes and sizes in accordance with frame and facial measurements

Module 3: Lens and Standards

Visit to lens manufacturing workshops - Video session on fitting of progressive lenses - ANSI standards

Module 4: Instruments and Analysis

Dispensing Instrumentation – Pupillometer - Pliers – PCD - Air blower – Distometer - Abbe's value, specific gravity, optical density, Pantoscopic flit

Module 5: Frames and Fittings

Patients selection, fitting Ms of PALs - Selection of designs - case study : problems, orientated dispensing optics - Recent developments - Special purpose frames - Safety wear

Textbooks: -

1. Clifford W Brooks & Irvin M Borish: System of Ophthalmic Dispensing, Professional press, 1979

Reference Books: -

1. Dispensing Optics, Ajay Kumar Bhootra, JP Medical Ltd, 2015, ISBN 935250013X, 9789352500130

20OP2031 Binocular Vision

Credits: 3:0:0

Course Objective:

1. To impart knowledge on the aspects and evolution of binocular vision.
2. To demonstrate the qualitative and quantitative diagnosis of binocular vision and its treatment.
3. To illustrate the types and procedures of strabismus and orthoptic procedures

Course Outcome:

At the end of the course student will be able to

1. Describe the evolution of binocular vision and its different parameters
2. Explain the development of binocular vision and its neural aspects
3. Illustrate the visually guided behavior in the diagnosis of binocular vision and its AV phenomena.
4. Demonstrate the various treatments and analysis of amblyopia in binocular vision
5. Analyze various types of strabismus and non-surgical management in binocular vision
6. Identify the orthoptic procedures involved in the treatment of binocular vision.

Module 1: Introduction to Binocular Vision

Spatial sense - Evolution of Binocular vision - Binocular fusion, suppression, revelry and summation - Visual direction, local sign and corresponding points -

Module 2: Aspects of Binocular vision

Visual distance, empirical cues - Panum's space – Stereopsis - Development of Binocular vision - The longitudinal horopter - Neural aspects of Binocular vision

Module 3: Diagnosis

Visually guided behaviour and aniselkonia – ARC - Qualitative and quantitative diagnosis of strabismus – Esodeviations – Exodeviations - A-V phenomena

Module 4: Treatment and Analysis

Cyclovertical squint - Pseudo strabismus - Amblyopia and eccentric fixation - Treatment of amblyopia

Module 5: Types and Procedures

Special forms of strabismus – Nystagmus - Non-surgical management of strabismus - Review of orthoptic procedures

Textbooks: -

1. R W Reading: Binocular Vision- Foundations and Applications

Reference Books: -

1. Basic Science, A.A.O (section-6) Pediatric Ophthalmology and Strabismus 1992-1993

20OP2032 LOW VISION AIDS LAB

Credits: 0:0:2

Course Objective:

1. To train the students to understand the low vision aids through the experiments
2. To demonstrate the experiments involving corrective measurements in low vision patients
3. To impart hands on skills in the different tests and lenses for the visually handicapped.

Course Outcome:

At the end of the course students will be able to

1. Demonstrate the practical skills on measurements and instrumentation techniques through refraction and radical retinoscopy
2. Describe the concepts and principles of evaluating near vision by prismatic scanning
3. Analyze optical and non-optical measurements for effective understanding of demonstrating aids
4. Describe the concepts and principles determining magnification and low vision aids through practical experiments
5. Workout calculations, property analysis of optic measurements for spectacle mounts and aids in different pathological conditions
6. Apply the concepts involved in selecting the contact lenses to administer the patients.

LIST OF EXPERIMENTS

1. Refraction, special charts.l Radical retinoscopy
2. Evaluating near vision: Amsier grid and field defects, prismatic scanning
3. Demonstrating aids – optical, Non-optical, Electronic
4. Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near
5. Spectacle mounted telescopes and microscopes
6. Choice of tests, aids in different pathological conditions
7. Contact lens combined system

20OP2033 DISPENSING OPTICS LAB

Credits: 0:0:2

Course Objective:

1. To train the students to understand the dispensing optics through the experiments
2. To demonstrate the experiments involving corrective measurements in vision correction in patients
3. To train them in different measurements and tests for the visually handicapped.

Course Outcome:

At the end of the course student will be able to

1. Demonstrate the practical skills on measurements and instrumentation techniques through optics center marking
2. Describe the concepts and principles of evaluating far and near PD measurements
3. Analyze effective understanding of pupillometer measurements in dispensing optics
4. Describe the concepts and principles determining tints and filters through practical experiments
5. Workout calculations, property analysis of different types of bifocal lenses in different pathological conditions
6. Apply the concepts involved in PAL's fitting to administer the patients.

LIST OF EXPERIMENTS

1. Optic center marking
2. PD Measurement – for far and near
3. Pupilliometer
4. Tints and filters to be shown – indications
5. Different types of Bifocals to be shown
6. PALs fitting

20OP2034 GLAUCOMA

3:0:0

Course Objective

- To provide knowledge on the most common systemic diseases, and their relationship to the abnormal ocular conditions.
- To provide knowledge on the different types of glaucoma and advances in the management of glaucoma
- To prepare students for clinical challenges that may appear in this rapidly advancing profession

Course Outcomes

At the end of the course the student will be able to

1. understand the basics of glaucoma
2. attain clear knowledge on the clinical examination of glaucoma.
3. interpret and diagnosis the different types of glaucoma.

4. articulate the medical characterisation of angle closure glaucoma.
5. detect developmental abnormality of angle of anterior chamber leading to high intraocular pressure.
6. adapt the proper medical treatment to normalize and control the intraocular pressure and to prevent loss of visual acuity.

Module 1 : Introduction to Glaucoma

Epidemiology – Heridity - Intra Ocular Pressure and Aqueous Humor Dynamics – Clinical Evaluation: Gonioscopy, Optic Nerve Head Analysis, Visual Fields.

Module 2 : Classification of Glaucoma

Open Angle Glaucoma: The Glaucoma Suspect, Open Angle Glaucoma Without Elevated IOP, Primary Open Angle Glaucoma: Etiology, Clinical Features, Diagnosis and Management - Secondary Open Angle Glaucoma.

Module 3 : Angle Closure Glaucoma

Angle Closure Glaucoma - Primary Angle Closure Glaucoma: Etiology, Clinical Classification, Clinical Features, Diagnosis and Management - Secondary Angle Closure Glaucoma.

Module 4 : Developmental Glaucoma

Developmental Glaucoma - Congenital Glaucoma - Infantile Glaucoma - Juvenile Glaucoma Syndromes with Glaucoma.

Module 5 : Medical Management of Glaucoma

Medical Management of Glaucoma - Surgery Therapy for Glaucoma - Newer Advances in the Management of Glaucoma.

Text Books:-

1. M Bruce Shields (MBS): Text Book of Glaucoma, Williams & Wilkins, London
2. Marc Leiberman: Simplified Guide to Computerized Perimetry childhood

20OP2035 PAEDIATRIC OPTOMETRY AND GERIATRIC OPTOMETRY

3:0:0

Course Objective

- To provide knowledge about ocular physiological changes of ageing
- To impart knowledge on the common geriatric systematic and ocular diseases.

- To demonstrate practical aspects of diagnosis and management of eye conditions related to pediatric inhabitants.

Course Outcomes
At the end of the course the student will be able to

1. understand the principal theories of childhoodt and visual development.
2. analyse a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues.
3. Attain clear knowledge on the accommodative-vergence system to assess the paediatric eye disorders.
4. Analyse the techniques for examining visual function of children of all ages and an understanding varied management concepts of paediatric vision disorders
5. identify and investigate the age related changes in the eyes.
6. Demonstrate dispensing contact lens, low vision aids and referral to the surgeon.

Module 1 : Genetic Factors

Genetic factors - Prenatal systems - Prenatal factors - Postnatal factors - Normal prenatal development and Embryology - Tissue Origin of the Various Structure of the Eye.

Module 2 : Paediatric Optometry

Anomalies of Prenatal And Postnatal Development: Orbit Eyelids Lacrimal System Conjunctiva Cornea Sclera Anterior Chamber, Uveal Tract, Pupils Lens, Vitreous, Fundus Oculomotor System - Measurement of Refractive Status - Determining Binocular Status.

Module 3 : Compensatory Treatment and Remedial Therapy

Myopia, Pseudo myopis, Hyperopia, Astigmatism, Anisotropies, Amblyopia - Remedial & compensatory treatment for strabismus & nystagmus - Visual aids for children C/ L & LVA

Module 4 : Geriatric Optometry

Structural Changes in Eye - Physiological Changes in Eye - Optical and Refractive Changes in Eye - Aphakia, Pseudo Aphakia and its Correction - Ocular Diseases Common in Old Eye - With Special Reference to Cataract, Glaucoma, Macular Disorders, Vascular Diseases of the Eye.

Module 5 : Medical Management of Geriatric Optometry

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? - Contact Lens in Elderly - Optometric Examination of Older Adults.

Text Books:-

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

20OP2036 CONTACT LENS

3:0:0

Course Objective

1. To provide the suitable knowledge to the student both in theoretical and practical aspects of Contact Lenses.
2. To impart knowledge on designing skills of various types of contact lens
3. To illustrate knowledge on fitting philosophies and recent development of contact lenses.

Course Outcomes

At the end of the course the student will be able to

1. Understand the history and basics of contact lenses.
2. List the important properties of contact lenses.
3. Predict the contact lens design for various kinds of patients
4. Recognize various type of contact lens fitting
5. Hypothesize the contact lens care procedures for the awareness of the patients
6. Demonstrate the instrumentation in contact lens practices.

Module 1 : 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 lenses.

Module 2 : Contact Lens Design

Glossary of Terms: Contact Lenses - Indications and Contra Indications of Contact Lens - Rigid gas permeable contact lens design - Soft contact lens design – Keratometry - Placido's disc – Topography.

Module 3 : Fitting Philosophies

Introduction to Contact lens fitting - Handling of contact lenses - Fitting of spherical Soft Contact Lens and effects of parameter changes - Astigmatism; Correction options - Fitting spherical RGP CL - Low DK High DK - Effects of RGP CL parameter changes on lens fitting - Fitting in Astigmatism - Fitting in Keratoconus - Fitting in Aphakia, Pseudophakia.

Module 4 : Contact Lens Care

Lens care & Hygiene Instructions Compliance - Follow up post fitting examination - Follow up slit lamp examinations - Cosmetic Contact lenses - Fitting contact lens in children - Toric Contact lenses - Bifocal contact lenses - Continuous wear and extended wear lenses - Therapeutic lenses / bandage lenses - Contact lens following ocular surgeries - Disposable contact lenses - Frequent replacement and lenses.

Module 5 : Contact Lens Practice

Use of Specular Microscopy and Tachymetry in Contact Lens - 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 for Special purposes – Swimming, Sports, Occupational etc., - Recent developments in Contact lenses - Review of lenses available in India.

Text Books:-

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

20OP2037 OCCUPATIONAL OPTOMETRY

3:0:0

Course Objective

1. To provide knowledge to the student on the general aspects of occupational health
2. To illustrate the ocular and visual problems of occupation
3. To impart knowledge on occupational hazards and remedial aspects through classroom teaching and field visits

Course Outcomes

At the end of the course the student will be able to

1. Understand the occupational health
2. Identify the visual requirements in various jobs.

3. Illustrate the effects of Physical, chemical and biological hazards on eye and vision
4. Analyze occupational causes of visual and eye problems.
5. Prescribe suitable corrective lenses and eye protective wear to the patients.
6. Formulate visual requirements and standards for different jobs.

Module 1 : Introduction

Introduction to Occupational Health, Hygiene and Safety - International Bodies: ILO, WHO - National Bodies: Labour Institutes, National Institutes of Occupational Health, National Safety Council.

Module 2 : Acts and Rules

Factories Act and Rules- Workmen's Compensation Act – ESI Act - Occupational Diseases/ Occupation Related Diseases Caused by Physical Agents, Chemical Agents and Biological Agents.

Module 3 : Occupational Hygiene and Safety

Environmental Monitoring Recognition - Evaluation and Control of Hazards Illumination – Definition, Measurements and Standards - Occupational Safety Causes of Accidents Vision, Lighting, Colour and Their Role - Accident Analysis - Accident Prevention.

Module 4 : Ocular and Visual Problems of Occupation

Electromagnetic Radiation - Ionizing Non-Ionizing: Infra-Red, Ultra Violet, Microwave, Laser – Injuries: Mechanical, Chemical -Toxicology – Metals, Chemicals - Prevention Of Occupational Diseases - Medical Examination / Medical Monitoring - Pre-Employment / Pre-Placement Periodic.

Module 5 : Personal Protective Equipment and Standards

General - Goggles, Face Shields - Selection And Use- Testing for Standards- Standards: Visual Standards for Jobs - Problems Of Special Occupational Groups: Drivers, Pilots and Others.

Text Books:-

1. Seymour L Coblens: ptometry and the Law, American Optometric Association, St.Louis,1976
2. R.A.F. Cox (ed.) fitness for work – the medical aspects. Oxford University Press 2000, reprinted 2003
3. Indian Association of Occupation Health, Guidelines on Pre-Employment Medical Examination, Pune 1998
4. Barbara A.Plog, Patrica J. Quinlan. Fundamentals of Industrial Hygiene. 5th Edition, 2002

20OP2038 SYSTEMATIC DISEASES

3:0:0

Course Objective

1. To provide knowledge on the definition and classification of systematic diseases.
2. To impart knowledge on clinical diagnosis, complications and management of various systematic diseases.
3. To illustrate the immunology and components of the immunity system

Course Outcomes

At the end of the course the student will be able to

1. Describe the common systematic conditions.
2. Classify the various systematic diseases and the respective clinical examinations.
3. Perform the clinical diagnosis of diverse systematic diseases.
4. Acquaint with the first aid knowledge and management options
5. Analyse the Ocular findings of the systematic conditions.
6. Design the report on malnutrition and immunology.

Module 1 : Arterial Hypertension and Diabetes Mellitus

Pathophysiology, Classification, Clinical Examination, Diagnosis, Complications, Management Hypertension and the Eye. Diabetes Mellitus: Pathology, Classification, Clinical Features, Diagnosis, Complications And Management Diabetes Mellitus and the Eye.

Module 2 : Embolism and Cancer

Acquired Heart Disease – Embolism: Rheumatic Fever- Pathophysiology, Classifications, Diagnosis, Complications, Management Embolism, Subacute Bacterial Endocarditis. Cancer: Definitions, Nomenclature, Characteristics of Benign and Malignant Neoplasms Grading of Staging of Cancer, Diagnosis, Principles of Treatment Neoplasia and the Eye.

Module 3 : Connective Tissue and Thyroid Disease

Anatomy and Pathophysiology Arthritis - Eye and connective tissue disease. Thyroid Disease: Anatomy and physiology of the thyroid gland, Classification of thyroid disease Diagnosis, complications, clinical features, management, thyroid disease and the eye.

Module 4 : Tuberculosis, Helminthiasis and Common Tropical Medical Ailments

Tuberculosis: Aetiology, Pathology, Clinical Features, Pulmonary Tuberculosis, Diagnosis, Complications, Treatment, Tuberculosis and the Eye. Helminthiasis: Classification, Schistosomiasis, Principles of Diagnosis and Management. Common Tropical Medical Ailments: Malaria - Tropical Diseases and the Eye: Leprosy, Toxoplasmosis, Syphillis Trachoma.

Module 5 : Malnutrition and Immunology

Malnutrition: Aetiology, Protein Energy Malnutrition, Water Electrolytes, Minerals, Vitamins, Nutritional Disorders and the Eye. Immunology: Components of the Immune System, Principle of Immunity in Health, Immunology in Disease, Immunology and the Eye. Neurological Disorders - Stroke/CVA: Disseminated Sclerosis and Subacute Combined Degeneration.

Text Books:-

1. Davidson's principles and Practice of Medicine, Ed. John Macleod, 14th Ed., ELBS/Churchill Livingstone (PPM)

20OP2039 CLINICS AND SPECIAL CLINICAL LAB I

0:0:3

Course Objective

To enable students to acquire the clinical skills necessary for entry into the pre-registration year following graduation

Course Outcomes

The students will be able

1. To demonstrate clinical understanding in all of the clinics covered in the unit
2. To demonstrate practical clinical competence in each of the areas covered by the unit
3. To develop effective clinical communication skills.
4. To demonstrate the instrumentation used in lens fitting.
5. To demonstrate the refraction and refractive errors in eye.
6. To demonstrate the contact lens fitting

1. Case Sheet
2. History Taking
3. Lensometry
4. Visual Acuity
5. Tests for Phorias and Tropias
6. External Examination
7. Slit Lamp Examination
8. Drugs And Method of Application
9. Do's and Don'ts – Papillary Dilatation
10. Direct Opthalmoscopy
11. Indirect Opthalmoscopy

12. Instrumentation
13. Patients Selection
14. Keratometry Reading
15. Refraction
16. Fluorescent Pattern
17. Over Refraction
18. Fitting of Hard Lenses
19. Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition. The students are made to observe the internees initially, then gradually they are encouraged to work up a patient, and perform various examination techniques.

20OP2040 CLINICS AND SPECIAL CLINICAL LAB II

0:0:3

Course Objective

To enable students to acquire the clinical skills necessary for entry into the pre-registration year following graduation

Course Outcomes

The students will be able

1. To demonstrate clinical understanding in all of the clinics covered in the unit
2. To demonstrate practical clinical competence in each of the areas covered by the unit
3. To develop effective clinical communication skills.
4. To demonstrate the instrumentation used in lens fitting.
5. To demonstrate the refraction and refractive errors in eye.
6. To demonstrate the contact lens fitting

1. Case Sheet
2. History Taking
3. Lensometry
4. Visual Acuity
5. Tests for Phorias and Tropias
6. External Examination
7. Slit Lamp Examination
8. Drugs And Method of Application

9. Do’s and Don’ts – Papillary Dilatation
10. Direct Opthalmoscopy
11. Indirect Opthalmoscopy
12. Instrumentation
13. Patients Selection
14. Keratometry Reading
15. Refraction
16. Fluorescent Pattern
17. Over Refraction
18. Fitting of Hard Lenses
19. Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition. The students are made to observe the internees initially, then gradually they are encouraged to work up a patient, and perform various examination techniques.