

Syllabus

Bachelor of Optometry (B. Optom.)

Department of Allied Health Science

School of Health & Medical Sciences



Adamas University

Kolkata, West Bengal - 700126

Annexure VIII

Course Structure of Bachelor of Optometry

Semester-I

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuous	Mid term	Total		
1.	OPT41101	General Human Anatomy & Physiology	3	1	0	4	30	20	50	50	100
2.	OPT41103	Geometrical Optics-I	3	1	0	4	30	20	50	50	100
3.	OPT41105	General Biochemistry	3	1	0	4	30	20	50	50	100
4.	OPT41107	Professional & Communicative English	2	0	0	2	30	20	50	50	100
5.	OPT41201	General Human Anatomy & Physiology Practical	0	0	4	2	N/A	50	50	50	100
6.	OPT41203	Geometrical Optics I Practical	0	0	4	2	N/A	50	50	50	100
7.	OPT41207	Professional Communication in English Practical	0	0	4	2	N/A	50	50	50	100
		Total				20					

Semester-II

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuous	Mid term	Total		
1.	OPT41102	Ocular Physiology and Anatomy	3	1	0	4	30	20	50	50	100
2.	OPT41104	Ophthalmic Pharmacology	3	1	0	4	30	20	50	50	100
3.	OPT41106	Physical Optics	3	1	0	4	30	20	50	50	100

4.	OPT41108	Computer Fundamentals and Programming	2	0	0	2	30	20	50	50	100
5	OPT41110	Environment and Ecology	2			2	30	20	50	50	100
8.	OPT41206	Physical Optics Practical	0	0	4	2	N/A	50	50	50	100
10.	OPT41208	Computer Application Practical	0	0	2	2	N/A	5 0	5 0	50	100
		Total				20					

Semester-III

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuous	Mid term	Total		
1.	OPT42101	Visual Optics 1	3	1	0	4	30	20	50	50	100
2	OPT42103	Microbiology and Pathology	3	1	0	4	30	20	50	50	100
4.	OPT42105	Lighting and the eye	3	1	0	4	30	20	50	50	100
4.	OPT42107	Clinical Refraction	3	1	0	4	30	20	50	50	100
5.	OPT42109	Ophthalmic Instruments and Procedure	3	1	0	4	30	20	50	50	100
6.	OPT42209	Ophthalmic instruments and procedure (Practical)	0	0	4	2	N/A	50	50	50	100
7.	OPT42207	Clinical Refraction Practical	0	0	4	2	N/A	50	50	50	100
		Total				24					

Semester-IV

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuous	Mid term	Total		
1.	OPT42102	Dispensing Optics -	3	1	0	4	30	20	50	50	100
2.	OPT42104	Visual Optics-II	3	1	0	4	30	20	50	50	100
3.	OPT42106	Ocular diseases-I	3	1	0	4	30	20	50	50	100
4.	OPT42108	Ophthalmic Imaging and Electro-Diagnostic Procedures	3	1	0	4	30	20	50	50	100
5	OPT42110	Geriatric and Paediatric Optometry	2	0	0	2	30	20	50	50	100
6.	OPT42202	Dispensing Optics Practical	0	0	4	2	N/A	50	50	50	100
7.	OPT42208	Ophthalmic Imaging and Electro-diagnostic Procedures Practical	0	0	4	2	N/A	50	50	50	100
Total						22					

Semester-V

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuo us	Mid term	Total		
1.	OPT43101	Contact Lens-I	3	1	0	4	30	20	50	50	100

2.	OPT43103	Binocular Vision-I	3	1	0	4	30	20	50	50	100
3.	OPT43105	Ocular Diseases-II	3	1	0	4	30	20	50	50	100
5	OPT43107	Public Health & Community Optometry	3	1	0	4	30	20	50	50	100
6.	OPT43109	Laws, regulations and Optometry	3	1	0	4	30	20	50	50	100
7.	OPT43201	Contact Lens-I Practical	0	0	4	2	N/A	50	50	50	100
8.	OPT43203	Binocular Vision-I Practical	0	0	4	2	N/A	50	50	50	100
		Total				24					

Semester-VI

S. No.	Course code	Subject	Period			Credit	Evaluation scheme				
			L	T	P		Mid term			End term	Total
							Continuos	Mid term	Total		
1.	OPT43102	Contact Lens--II	3	1	0	4	30	20	50	50	100
2.	OPT43104	Binocular Vision-II	3	1	0	4	30	20	50	50	100
3.	OPT43106	Research Methodology & Biostatistics	2	0	0	2	30	20	50	50	100
5.	OPT43108	Low Vision and Visual Rehabilitation	3	1	0	4	30	20	50	50	100

6.	OPT43202	Contact Lens—II Practical	0	0	4	4	N/A	50	50	50	100
7.	OPT43204	Binocular Vision-II Practical	0	0	4	2	N/A	50	50	50	100
8.	OPT43208	Low Vision and Visual Rehabilitation Practical	0	0	4	2	N/A	50	50	50	100
Total						22					

Semester-VII

S. No.	Course code	Subject	Credit
1.	OPT44101	Project Dissertation	8
2	OPT44103	Internship	6
Total			14

Semester-VIII

S. No.	Course code	Subject	Credit
1.	OPT44102	Internship	6
2.	OPT44104	Comprehensive Viva Voce	8
Total			14

Total credit points for the program

Semester	Credit Points
I	20
II	20
III	24
IV	22
V	24
VI	22
VII	14
VIII	14
Total credit points	160

Please Note: Subject, Subject Code and Credit marked in red are addition to the existing curriculum

YEAR-I

SEMESTER-I

COURSE NAME: GENERAL HUMAN ANATOMY & PHYSIOLOGY - THEORY

COURSE CODE: OPT41101

CONTACT: 3L+1T

CREDITS: 4 (45 HOURS)

COURSE OBJECTIVE:

The subject is designed to give basic knowledge of anatomy and physiology of the human body which will give a basic idea of how the body works in normal condition. This subject will lay down a basic fundamental knowledge in the field of optometry.

After completing the course, the students will be able to:

- 1) Explain the basic mechanism and fundamentals of human anatomy and physiology.
- 2) Understand the mechanism of various joints, muscles and nerve function.
- 3) Function and understanding of spermatogenesis and oogenesis.
- 4) Apply the knowledge of blood to understand various function of different parts of the body.
- 5) Understand the cardiac cycle and renal function of our body.

COURSE CONTENTS:

Unit I

1. The skeleton – axial & appendicular (over view), Cavities of body- (cranial, thoracic, abdominal, pelvic). Structure of bone, Type & function of bone, Blood & nerve supply of the bone. Planes of the body. Anatomical terminology.
2. Skull – General features, Cranial bones (frontal, parietal, temporal, occipital, sphenoid, ethmoid). Facial bone – (nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal conchae, vomer, mandible). Special feature of the skull (sutures, paranasal sinuses, foramina, fontanel, nasal septum).
3. Joints – classification, fibrous joints, cartilaginous joints, synovial joints (structure & types). Types of movement at the joints.
4. Anatomy of muscular system – Skeletal muscle structure. Important skeletal muscle (muscles of facial expression, mastication. Muscle that moves the head). Over view of Trunk muscles, upper limb muscles, lower limb muscles.
5. Muscular Physiology: Microscopic and electron microscopic structure of skeletal, smooth and cardiac muscles. Difference between skeletal, smooth and cardiac muscles. The sarco-tubular system. Red and white striated muscle fibres. Single unit and multi-unit smooth muscle. Motor point. Properties of muscle: excitability and contractility, all or none law, summation of stimuli, summation of contractions, effects of repeated stimuli, genesis of tetanus, onset of fatigue, refractory period, tonicity, conductivity, extensibility and elasticity. Electromyography. Muscle contraction – E C Coupling, Muscle fatigue, Rigor mortis, Sliding filament theory, Slow & fast muscle fibres, Isotonic & Isometric contraction.

Unit II

1. Anatomy of nervous system – Neuro Physiology: Electron microscopic structure of nerve cell or neurons. Neuroglia. Myelinated and unmyelinated nerve fibres. Conduction velocity of nerve impulse in relation to myelination and diameter of nerve fibres. Properties of nerve fibres – excitability, conductivity, all-or-none law, accommodation, adaptation, summation, refractory period, indefatigability. Concept of chronaxie and rheobase. Synapses – types, structure, synaptic transmission of the impulse, synaptic potentials, neurotransmitters. Motor unit. Injury to peripheral nerves – degeneration and regeneration-brief idea. Automatic nervous system – Introduction, Comparison of autonomic & somatic nervous system, Anatomy of autonomic motor pathways – pre-ganglionic neurons, autonomic ganglia, sympathetic ganglia, autonomic plexus, post-ganglionic neurons structure of sympathetic and parasympathetic division.
2. ANS- neurotransmitter and receptors- cholinergic neurons & receptors. Receptor agonist & antagonist. Physiological effect of ANS sympathetic & parasympathetic response. Integration & control of autonomic function- autonomic Reflexes, autonomic control by higher centres. Neural Transmission- Introduction, Autonomic Synaptic Transmission-Modes of transmission, sympathetic & parasympathetic response.

3. CNS Synaptic Transmission-Electrical synaptic transmission & chemical synaptic transmission. Neuro muscular Junction – The neuromuscular junctions – structure, events in transmission, end-plate potential, post tetanic potential.

4. Spinal cord anatomy (external & internal anatomy)- Connection & distribution of spinal nerves-overview (Branches, plexuses. Intercostal nerves). Overview of brain organization & blood supply. Brief anatomical idea on – brain stem, cerebellum, diencephalon, cerebrum. Cranial nerves

Unit III

5. Embryology – general Gametogenesis (spermatogenesis & oogenesis) –Structure of testis, ovary & sperm –Phases of embryonic development – formation of three germ layers- derivatives of germ layers – Embryonic or Foetal membrane (chorion, amnion, allantois, yolk sac) &placenta & its functions.

Unit IV

6. Cell Structure: Ultra structure and functions of cell- Plasma membrane- Nucleus – Mitochondria-Centrosome-Ribosome-Endoplasmic reticulum- Golgi body & lysosome. Nucleus – Ultra structure & functions. Chromosomes: Structure & chemical composition, types of chromosomes. Chromosome aberration.

7. Cell Division: Amitosis- Mitosis- Meiosis- Significance of mitosis & meiosis- Cell cycle.

8. Tissues: Structure, position and functions of epithelial, connective, muscular & nervous tissue

9. Genetics: Nucleic acid- 1. Structure of DNA- Physical & Chemical properties of DNA & RNA, Ultra structure & types of DNA & RNA (in details), Brief idea about super coiling of DNA Semiconservative mode of replication of DNA, Mechanism of replication of DNA, Genetic code. Genetically relation of color blindness and ocular albinism. Chromosome aberration- Structural aberration- Deletion- Duplication- Inversion- translocation. Numerical aberration (Polyploidy & aneuploidy- Hyper & hypo). Gene mutation-classification-spontaneous & Induced/Chemical mutation- Practical Application of mutation.

Unit V

10. Blood Vascular system Composition and functions of blood. Plasma proteins – normal values, origin and functions. Brief idea on Bone marrow. Formed elements of blood – origin, formation, functions and fate. Haemoglobin – functions, compounds and derivatives. Abnormal haemoglobin-overview. Thalassaemia-brief idea. Different types of anaemia and their B. Optometry Syllabus 6 causes-overview. Erythrocyte sedimentation rate (ESR) and its significance. Haematocrit. PCV, MCV, MCH, MCHC. Blood volume – normal values, regulation. Blood coagulation – factors, process, anticoagulants, Prothrombin time. Clotting time. Bleeding time. Blood groups – ABO systems and Rh factors. Blood transfusion.

11. Ultra-structure & functions of blood vessels (artery & vein). Structure type and function of capillaries. Differences between artery & vein.

Unit VI

12. Cardio Vascular System – Structure & function of Heart & blood vessels (artery, vein and capillary) (Anatomical position, chambers of heart.) Blood circulation through heart. Special junctional tissue of heart. (Myogenic and neurogenic heart) conducting system of heart. E.C.G. Cardiac cycle. Heart Sound, Blood vessels – type, Structure & function, Systemic & pulmonary circulation.

13. Cardiac cycle and cardiac output. Blood Pressure-regulation & controlling factors.

14. Renal System- Function of kidney, Anatomy & Histology of Nephron & collecting duct. – Urine formation ((Filtration, reabsorption and secretion)- Counter – current system of urine concentration, Anomalies in urine concentration.

RECOMMENDED BOOKS:

1. Human anatomy B.D. Chourasia
2. Text book of human anatomy H. Gray
3. Anatomy and Physiology of the eye A.K. Khurana, Indu Khurana
4. Clinical anatomy of the eye S. Snell, A. Lemp
5. Text book of Anatomy Vishram Singh
6. Text book of medical physiology Guyton
7. Human physiology AK Jain, Indu Khurana
8. Human physiology Chatterjee
9. Adler's physiology of the eye Robert. A. Moses, William. M. Hart. Jr

COURSE NAME: GEOMETRICAL OPTICS – I - THEORY

COURSE CODE: OPT41103

CONTACT: 3L+1T

CREDITS: 4 (45 HOURS)

COURSE OBJECTIVE:

This course will give basic knowledge of optics which will give basic understanding and application of optics in the field of optometry.

After completing the course, the students will be able:

- 1) Explain the nature and properties of light with the help of different theories and principles.
- 2) Understand the knowledge of reflection and refraction of light at subsequent media.
- 3) Illustrate the knowledge on thick and thin lenses.
- 4) Analyse the optical component of the eye.

COURSE CONTENTS:

Unit I

1. Properties of light: Classification of optics based on the nature and properties of light. The rectilinear propagation of light, Umbra and Penumbra, Speed of light in vacuum and in a stationary media, Beam, pencil and ray of light, Laws of reflection and refraction, Refractive index, Optical path, Graphical construction for refraction, Principle of reversibility, Fermat's principle (only qualitative discussion), Colour dispersion.

Unit II

2. Plane surfaces and Prisms: Parallel beam, the critical angle and total reflection, Plane parallel plate, Refraction by a prism, Minimum deviation, thin prisms, Graphical method of ray tracing, Direct vision prisms, Reflection of divergent rays, Refraction of divergent rays, Images formed by paraxial rays. Ophthalmic prisms.

3. Spherical surfaces: Introduction, Focal points and focal lengths, Image formation, Virtual images, conjugate points and planes, Convention of signs, Graphical constructions (parallel ray method only), Magnification, Vergence and reduced vergence, Gaussian formula.

4. Spherical mirrors – focal points, focal lengths, image formation, mirrors and vergence, reflection matrix, aspheric mirrors

5. Thin lenses: Lenses, Focal points and focal lengths, Image formation: graphical method (parallel ray and oblique ray methods) and derivation of lens formula, conjugate points and planes. Lateral magnification, Virtual images, Lens makers' formula, Power of a thin lens, thin lenses in contact, without contact.

6. Thick lenses: Image formation: graphical method (both parallel ray and oblique ray methods), Focal points, principal points, nodal points and optical centre, thick lens formulas (no derivation).

Unit III

7. Matrix methods in paraxial optics: Introduction, Translation matrix, Refraction matrix, Reflection matrix and thick lens and thin lens matrices. Numerical.

8. Aberration theory: Spherical (coma, astigmatism, curvature of field and distortion) and chromatic aberrations and their minimization including GRIN systems (qualitative description only).

Unit IV

9. Optics of the Eye: Biological structure of the eye, Optical representation of the eye, Functions of the eye, Errors of refraction and their correction, Laser therapy for ocular defects. Depth of focus. Aperture and stops: Field stops and Aperture stop, Entrance and exit pupils, chief ray, Front stop, stop between two lenses, two lenses with no stop, field of view 11. Optical Instruments – The Camera, eye and its refractive anomalies, simple magnifier, compound microscope and telescopes.

RECOMMENDED BOOKS:

1. Fundamentals of Optics – 4th edition – Francis. A. Jenkins and Harvey. E. White.
2. A textbook of Optics – N. Subrahmanyam and Brij Lal.



3. Introduction to optics – Frank. L. Pedrotti and Leno. S. Pedrotti.
4. Physics for scientists and Engineers with modern Physics, Vol 2, 6th Edition, Serway and Jewett
5. Introductory lighting (Illuminating engineering society of North America)
6. Environmental vision (Pitts).

COURSE NAME: GENERAL BIOCHEMISTRY - THEORY

COURSE CODE: OPT41105

CONTACT: 3L +1 T

CREDIT: 4 (45 HOURS)

COURSE OBJECTIVE:

On completion of this course, the students will be able to understand Structure, function and interrelationship of biomolecules. On completion of this course, the students will be able to understand consequences of deviation from normal. On completion of this course, the students will be able to understand. Integration of the various aspects of metabolism, and their regulatory pathways. On completion of this course, the students will be able to understand Principles of various conventional and specialized laboratory investigations. On completion of this course, the students will be able to understand analysis and interpretation of a given data.

COURSE CONTENT:

Unit I

1. Carbohydrate Chemistry: Definition, general classification with examples, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Glycosaminoglycans (mucopolysaccharides-in detail)
2. Lipid Chemistry: Definition, general classification Definition, classification, and functions of Fatty acids, Cholesterol, Essential fatty acids, Phospholipids and their importance
3. Amino-acid Chemistry: Amino acid chemistry: Definition, Classification, Peptide bonds, Peptides: Definition, biologically important peptides. Protein chemistry: Definition, Classification, Functions of proteins, Collagens, Plasma proteins, Muscle proteins
4. Enzymes: Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Mechanism of enzyme action. Diagnostic enzymology (clinical significance of enzymes)
5. Nucleotide and Nucleic Acid Chemistry: Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body. Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of TRNA, RRNA, MRNA.

Unit II

6. Digestion and Absorption: General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.
7. Fundamentals of Biological oxidative reactions-ATP formation.
8. Carbohydrate Metabolism: Introduction, Glycolysis – Aerobic, Anaerobic, Citric acid cycle, HMP Shunt pathway.
9. Lipid Metabolism: Introduction to lipid metabolism, Lipolysis, β -oxidation of fatty acids, Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test. Cholesterol metabolism: degradation, cholesterol transport Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypo-cholesterol emic agents
10. Amino acid and Protein Metabolism: Catabolism of amino acids – Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle Specialized products formed from amino acids – from glycine, arginine, methionine, phenylalanine, tyrosine.

Unit III

11. Vitamins: Definition, classification according to solubility, Individual vitamins (Water soluble & fat soluble) – Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity

12. Mineral Metabolism: Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals – Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail

Unit IV

13. Cell Biology: Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton

Unit V

14. Nutrition: Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person – Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food Physical activities – Energy expenditure for various activities. Calculation of energy requirement of a person Balanced Diet Recommended dietary allowances Role of carbohydrates in diet: Digestible carbohydrates and dietary fibres. Role of lipids in diet Role of proteins in diet: Quality of proteins – Biological value, net protein utilization, Nutritional 8 aspects of proteins-essential and non-essential amino acids. Nitrogen balance Nutritional disorders

15. Acid-Base balance; Acids, bases and buffers, Ph. Buffer systems of the body, blood buffers, mechanism of buffer action. H⁺ and Ph measurements.

16. Measles and associated eye disorders, low birth weight

Unit VI

17. Free radicals – Biological Reactions-Oxidants- antioxidants, -diseases –Therapeutic uses of antioxidants

18. Cornea – Biochemical composition of cornea. Sources of Nutrients-Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt

19. Tear film, Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy

20. Lens – Biochemical composition of lens. Lens protein – their types & characteristics. Lens Metabolism – Carbohydrate metabolism, protein metabolism. Cataract – Due to biochemical defects of lens. Antioxidant mechanism in the lens.

21. Biochemistry of the visual process- B.

RECOMMENDED TEXT BOOKS:

1. Text book of Biochemistry Satyanarayana
2. Text book of Biochemistry A.C Deb
3. Text book of Biochemistry S.K 12 Dasgupta
4. Biochemistry of the eye David. R. while Hart

COURSE NAME: PROFESSIONAL AND COMMUNICATIVE ENGLISH - THEORY

COURSE CODE: OPT41107

CONTACT: 2L

CREDIT: 2

COURSE OBJECTIVE:

The objective of the course is to: 1. Understand simple texts and a range of high frequency vocabulary in context 2. Describe aspects of personal and everyday life in both oral and written form 3. Produce short and simple connected texts on familiar topics 4. Basic understanding into pronunciation of English sounds.

COURSE CONTENT:

Unit I

1.Functional English - Grammar, Components of a sentence – Verb -Transformation of sentences – Voice – Reported speech h – Positive/ negative -Statement/ Interrogative – Subject verb agreement

Unit II



2. Common errors – Exercises, Vocabulary/ Synonyms and antonyms – Idioms and phrases – Similes -Words denoting assemblage

Unit III

3. Writing skills- Note making – Summarizing – Report writing – Letter writing -Expansion of an idea – Comprehension

Unit IV

4. COMMUNICATION: Introduction, Communication process – Elements of communication – Barriers of communication and how to overcome them ,Speaking , Importance of speaking efficiently – Voice culture – Preparation of speech – secrets of good delivery – Audience psychology handling – Presentation skills – Conference/ Interview technique Listening , Importance of listening – Self-awareness about listening -Action plan execution – Barriers in listening – Good and persuasive listening, Reading- What is efficient and fast reading? What is Awareness of existing reading habits – Tested techniques for improving speed – Improving concentration and comprehension through systematic study, Memory – What is memory, Brain- mind potential? – Systems for memorizing – Summary page – Building positive mental habits, Nonverbal Communication, Basics of nonverbal communication, Self-awareness, Self-image – Self talk – Relaxation – Personality development

SUGGESTED READINGS:

1. COMMUNICATION (MARK MCCORMACK)
2. HOW TO WRITE REPORTS (JOHN METCHELL)
3. BUSINESS CORRESPONDENCE AND REPORT R.C. SHARMA & K. MOHAN (TATA MC GRAW, NEW DELHI 1984)

COURSE NAME: DESIGN THINKING

COURSE CODE: DGS11001

CONTACT:

CREDITS: 2

COURSE NAME: GENERAL HUMAN ANATOMY & PHYSIOLOGY - PRACTICAL

COURSE CODE: OPT41201

CONTACT: 4 (P)

CREDITS: 2

COURSE OBJECTIVE:

1. Describe the gross structure of human body 2. Describe, specifically Musculo-skeletal, Cardio-respiratory and nervous system. 3. Apply the anatomical principles in the practice of Optometry. At the end of the course the student will be able to: • Explain the normal functioning of various organ systems of the body and their interactions. • Elucidate the physiological aspects of normal growth and development. • Describe the physiological response and adaptations to environmental stresses. • Know the physiological principles underlying pathogenesis of disease.

EXPERIMENTS TO BE PERFORMED:

- 1 Microscope & Haemocytometer
- 2 Blood:
 - 2.1. RBC count
 - 2.2. Hb
 - 2.3. WBC count
 - 2.4. Differential count
 - 2.5. ESR
 - 2.6. Blood group and Rh type
 - 2.7. Bleeding time
 - 2.8. Clotting time
3. Digestion – Test salivary digestion



4. Excretion-

4.1. Examination of urine – Specific Gravity, Presence of Albumin, Sugar, Microscopic examination for cells and cyst

5. Endocrinology & Reproduction-Dry experiments in the form of cases showing different endocrine Disorders

6. Respiratory system-

6.1. Clinical examination of respiratory system

6.2. Spirometry

6.3. Breath holding test

6.4. Endurance test

7 Cardiovascular system-

7.1. Clinical examination of circulatory system

7.2. Measurement of blood pressure and pulse rate

7.3. Effect of exercise on blood pressure and pulse rate

8. Central Nervous System-

8.1. Sensory system

8.2. Motor system

8.3. Cranial system

8.4. Superficial reflexes

8.5. Test for hearing

COURSE NAME: GEOMETRICAL OPTICS I - PRACTICAL

COURSE CODE: OPT41203

CONTACT: 4 (P)

CREDIT: 2

COURSE OBJECTIVE:

- 1) Explain the nature and properties of light with the help of different theories and principles.
- 2) Understand the knowledge of reflection and refraction of light at subsequent media.
- 3) Illustrate the knowledge on thick and thin lenses.
- 4) Analyse the optical component of the eye.

EXPERIMENTS TO BE PERFORMED:

1. Law of reflection
2. Law of refraction
3. Critical angle of glass
4. Angle of minimum deviation using I-d curve
5. f & μ of convex lens
6. f & μ of concave lens
7. f of convex mirror
8. f of concave mirror
9. μ of solid
10. μ of liquid
11. Angle of the prism – using spectrometer
12. Determination of Cauchy's constant
13. μ of the material of the crown and flint glasses for Na light
14. Dispersive power of a prism
15. Verification of inverse square law of radiation using a photometer
16. Photometer – determination of transmission coefficient.

COURSE NAME: PROFESSIONAL COMMUNICATION IN ENGLISH - PRACTICAL

COURSE CODE: OPT41207

CONTACT: 4 (P)



CREDIT: 2

COURSE OBJECTIVE:

The objective of the course is to:

1. Understand simple texts and a range of high frequency vocabulary in context
2. Describe aspects of personal and everyday life in both oral and written form
3. Produce short and simple connected texts on familiar topics
4. Basic understanding into pronunciation of English sounds.

Module:1 Grammar-structure of sentences etc.

Module:2 Essay- Descriptive-Comparative-Argumentative etc.

Module:3 Drafting of email & letter writing

Module:4 Reading Comprehension from recommended text etc. biodata, Resume-curriculum vitae etc.

Module:5 Report writing-structure, types of reports etc

YEAR-I

SEMESTER – II

COURSE NAME: OCULAR PHYSIOLOGY AND ANATOMY - THEORY

COURSE CODE: OPT41102

CONTACT: 3L+ 1T

CREDIT: 4 (45 HRS)

COURSE OBJECTIVE:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa. 2. Identify the microscopic structures of various tissues in the eye and correlate the structure with the functions. 3. Comprehend the basic structure and connections between the various parts of the central nervous system and the eye so as to understand the neural connections and distribution. 4. To understand the basic principles of ocular embryology. The objective of the course is to:

1. Explain the normal functioning of all structures of the eye and their interactions
2. Elucidate the physiological aspects of normal growth and development of the eye
3. Understand the phenomenon of vision
4. List the physiological principles underlying pathogenesis and treatment of diseases of the eye

COURSE CONTENT:

Unit I

1. Cornea: Anatomy and Physiology: structure of cornea. Corneal transparency & hydration, Regulation of corneal transparency & hydration. Corneal vascularization. Maurice theory & Goldman's theory
2. Uveal tissue: Anatomy and Physiology: Uveal meshwork. Uveo-scleral drainage. Schlemm's canal switch.
3. Lens: Anatomy and Physiology about human lens. Function of lens. Lens transparency. Lens culture. Changes in ageing lens. Cataract – overview.
4. Aqueous humour: Anatomy of Aqueous Humour, Formation of Aqueous humour. Drainage & circulation of Aqueous Humour. Rates of production & flow. Functions of Aqueous humour.
5. Vitreous Humour: Anatomy of Vitreous Humour, Composition & distribution of vitreous humour, Physiology & function of vitreous humour, Optical role of vitreous humour.
6. Retina: Retinal structure-layers of retina. Brief idea about rod & cones. Organization of retina. Function of retina.
7. Optic Nerve: Physiology of optic nerve. Papilledema of optic nerve. Optic atrophy.

Unit II

8. Ocular Circulation: Vascular structure of the eye – ocular circulation, blood-ocular barrier (Blood-retinal, blood Vitreous & blood aqueous barrier). Regulation of ocular circulation.

Unit III

9. Protective Mechanism of the eye – a. Blinking – muscles of lid closure & lid opening (orbicularis oculi, levator palpebrae, Muller's muscle, blinking reflexes. b. Lacrimation – i) Lacrimal glands ii) Pre corneal tear film iii) Chemistry of lacrimal secretion tear film iv) Tear film dynamics (secretion of tear, formation of tear, retention & redistribution of tear, displacement phenomena, evaporation from tear film, drying & breakup of tear film, dynamic events during blinking, elimination of tear.)
10. The ocular motor system – a. Extra ocular muscles their function & nerve supply b. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. c. Physiology of ocular movement – Basic Kinematics, (position of gaze, Fick's axes) d. Ocular Movement (monocular and Binocular). Supra nuclear control of eye movements. e. Ocular movements - i) Monocular Movements (Adduction, Abduction, supraduction, infra duction, Incyclo duction, excyclo duction) ii) Binocular Movements –VERSIONS- (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). VERGENCES – (Convergence, divergence, vertical vergence)
11. Intraocular pressure – Features of normal IOP, Factors influencing the IOP, Control of IOP, Measurement of IOP.
12. Pupil – Normal pupil, Physiological changes in pupil size – Isocoria, Pupillary unrest, Hippies. Pupillary reflex – Light reflex, Near reflex, Darkness reflex, Psycho sensory reflex, Lid closure reflex
13. Accommodation – a. Far point, near point, range & amplitude of Accommodation b. Mechanism of accommodation – Increased tension theory, Relaxation theory, Role of lens capsule, Gullstrand mechanical

model of accommodation, c. Stimulus for accommodation d. Ocular changes in accommodation. e. Changes in accommodation with arc (Presbyopia) f. Nervous mechanism for accommodation

Unit IV

14. Color vision- Physiological, Photochemical & neurological basis of color vision, Electrophysiology of color vision, Granit's modulator and dominator theory, Purkinje phenomenon. Young-Helmholtz theory, Types of color defects, Color blindness, Neural analysis

15. Geniculate cortex- a. Structure of geniculate cortex. b. Electrophysiology c. Projection – retinal projection d. Detail idea about visual cortex & function of visual cortex.

Unit V

16. Visual perception – Higher integrative activity, Binocular perception, stereoscopic depth perception. b. Neurophysiology of perception – Higher visual pathways (primary visual Pathway to cerebral centre, Lateral Geniculate body, non-geniculate targets for retino fugal input, visual centre) c. Neurophysiology of perception – Spatial analysis, Double pathway to higher visual centres.

17. Physiology of vision – a. Visual acuity – visual angle, Components of Visual acuity (Minimum visible, Resolution, Recognition Hyperacidity), Factors affecting, Measurement of visual acuity. b. Contrast Sensitivity – Types- (spatial & Temporal contrast sensitivity), Neural Mechanism, Measurement of contrast sensitivity (Arden gratings, Cambridge low contrast gratings, Pelli – Robson chart) c. Light & Dark adaptation – Dark adaptation curve, Mechanism of dark adaptation, Factors influencing dark adaptation, Time course of light adaptation, Mechanism of light adaptation, Rod vs. cone light adaptation. Purkinje shift of spectral sensitivity. d. Binocular vision – Grades of binocular vision (simultaneous, fusion & stereopsis), Advantages of binocular vision, visual direction & horopter, Binocular fusion, Dichoptic stimulation, Depth perception, Integration of motor & sensory system. e. Electrodiagnostic tests – ERG, EOG, VER

Embryology –ocular Formation of optic vesicle & optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, ciliary body, iris, vitreous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye.

2. Orbit Bony orbit→ Size, shape & relations, walls of the orbit, Base of the orbit, Apex of orbit. Orbital fascia →Fascial bulbi, Fascial sheaths of extraocular muscles, intermuscular septa. Spaces of orbit → Orbit fat & reticular tissue - Apertures at the base of orbit- Contents of the orbit - Orbital nerve→ oculomotor, Trochlear, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects.

RECOMMENDED READING:

- 1) Anatomy and Physiology of Eye – A.K. Khurana
- 2) Clinical Anatomy and Physiology of Eye –Lee Ann Remington

COURSE NAME: OPHTHALMIC PHARMACOLOGY - THEORY

COURSE CODE: OPT41104

CONTACT: 3L + 1T

CREDIT: 4 (45 HRS)

COURSE OBJECTIVE:

This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes. Course Outcomes At the end of the course, students will be able to: 1. understand the basic principles of pharmacokinetics and pharmacodynamics 2. Acquire knowledge on types of ocular drugs and their mechanisms 3. understand the indications and contraindications of ocular drugs 4. understand the drug dosage and routes of administration CO5 students should acquire the knowledge on adverse effects.

COURSE CONTENT:

Unit I

1. General Pharmacology: • Nature & Sources of drug. Routes of drug administration (general & Ocular).

Unit II



2. New drug delivery systems. Absorption & Bio availability of a drug. Distribution of a drug. Fate of a drug. Drug excretion & toxicity. Pharmacokinetics of drugs.

3. Drug action → site of drug action, structure activity relationship. Drug receptor. Mechanism of action of a drug. Dose response relationship.

4. Adverse drug reactions (ADR) in man, Manifestations of ADR.

Unit III

5. Treatment of Acute drug poisoning. Factors influencing drug metabolism & drug action. 6. Classification of drugs. • Drug action on the nervous system → General Considerations. Aliphatic Alcohol's.

Unit IV

7. General Anaesthetics.

8. Sedatives, Hypnotics and Pharmacotherapy of Insomnia.

9. Drugs Effective in Convulsive Disorders.

10. Opioid Analgesics.

11. Analgesic – Antipyretics and Nonsteroidal Anti-inflammatory Drugs (NSAID).

12. Central Nervous System Stimulants.

13. Local Anaesthetics → Cocaine, Procaine and Other Synthetics Local Anaesthetics.

Unit V

14. Autonomic Nervous System → General Considerations. Adrenergic and Adrenergic Blocking Drugs.

15. Ocular • Preparation and packaging of ophthalmic drugs • Drug action and effectiveness • Ocular penetration

16. Ophthalmic diagnostic drugs.

17. Topical anaesthetics

Unit VI

18. Ophthalmic Drugs – Antibiotics, corticosteroids, anaesthetics, viscoelastic agents. Anti-glaucomic drugs

RECOMMENDED READING:

Text book of pharmacology: Ashok Garg and Suresh. K. Pandey

COURSE NAME: PHYSICAL OPTICS - THEORY

COURSE CODE: OPT41106

CONTACT: 3L + 1T

CREDIT: 4 (45 HRS)

COURSE OBJECTIVES:

The objective of the course is to:

- 1) Analyse the dual nature of the light.
- 2) Understand the different principle of reflection and refraction of light.
- 3) Analyse the different interference pattern of the light.
- 4) Interpret the light passing through different medium.
- 5) Understand the diffraction of light through different slit and medium
- 6) Understand the concept of polarisation and its interpretation.

COURSE CONTENT:

Unit I

1. Dual nature of light- Simple harmonic motion- differential; Simple harmonic waves- mathematical representation; Super position of simple harmonic waves.

Unit II

2. HUYGENS principle – laws of reflection and refraction at plane and spherical surfaces. Wave velocity & group velocity; determination of velocity of light (any one method.)

Unit III

3. Interference: Coherence; path and phase difference; Theory of interference fringes intensity distribution infringes; Young's double slit experiment- Fresnel's' biprism, Lloyds' error experiments; visibility of fringes.



Unit IV

4. Interference in thin films due to reflected and transmuted light- Interference in wedge Shaped films; Newton's ring experiment; Color of thin films; Thin film antireflection wating and filters.

Unit V

5. Diffraction: • Diffraction by single slit; double slit, multiple slit- grating, circular aperture – amplitude & intensity distribution (final expressions only) • Circular aperture- airy pattern, resolution by circular apertures. • Diffraction grating- reflection, transmission, amplitude & phase gratings (definitions in brief) Grating dispersion & disperse power, spectral resolution; zone plates. Polarization & Crystal Optics.

Unit VI

Concept of polarization, linear, circular, elliptical polarization (qualitatively), Plane of polarization & vibration, degree of polarization, polarizes, analysers, Production of polarized light, birefringence, calculate crystal, veal prism, Wallaston prism, retarders - full, half & quarter wave plates, analysis of light of unknown Polarization. • Linear Scattering- Raleigh & Mee • Principles of LASERS • Holography – basic principle; simple experimental arrangement, some applications.

RECOMMENDED READING:

1. Fundamentals of Optics – 4th edition – Francis. A. Jenkins and Harvey. E. White.
2. A textbook of Optics – N. Subrahmanyam and Brij Lal.
3. Introduction to optics – Frank. L. Pedrotti and Leno. S. Pedrotti.
4. Physics for scientists and Engineers with modern Physics, Vol 2, 6th Edition, Serway and Jewett
5. Introductory lighting (Illuminating engineering society of North America)

COURSE NAME: COMPUTER FUNDAMENTALS AND PROGRAMMING - THEORY

COURSE CODE: OPT41108

CONTACT: 2 (L)

CREDIT: 2

COURSE OBJECTIVE:

The objective of the course is to:

- 1) Understand the basic computer architecture and binary conversion.
- 2) Analyse the different Boolean algebra and basic theorem of Boolean algebra.
- 3) Understand the demorgan theorem and its application.
- 4) Interpret the basic knowledge of C in different computer application.

COURSE CONTENT:

Unit I

1. Basic computer Architecture: Fundamentals of Computers, Block diagram of PC, peripheral devices of PC and their functions Number System & Data Representation: Decimal Number System, Binary number system, Decimal to Binary conversion, Binary operations. Octal number system & the conversion. Octal to Decimal. Binary to Octal & Vice Versa.

Unit II

2. Boolean Algebra: Definition, Difference between Boolean with Arithmetic & ordinary algebra. Two valued Boolean Algebra. Basic theorems of Boolean Algebra. Precedence of operators. Boolean function & truth tables.

Unit III

3. The AND, OR, NOT gate. De-Morgans theorem.
4. The NOR, NAND gate. The XOR & X-NOR gate. Conversion of Boolean expression into logic diagram.
5. Using AND, OR, AND, NOT gates. Logic Circuits: Combinational logic circuit, Adder, Subtractor, Decoder, Encoder.

Unit IV

6. Operating System: Introduction & classification of software, working principle of MS DOS (Some basic internal & external commands). Creating a file. Windows & its components. Accessories, program manager, main, desktop icons. MS- Office: Introduction of word processing-invoking MS-word – create, edit, save



document, cut & paste perform operations on blocks of text, header & footer, Mail Merge, printer setup. Introduction of EXCEL. Concept of worksheet, making Charts & graphs, perform calculations & re calculations. C-Language: Overview of C, algorithm & flow chart, datatypes. Variables & constants, operators, expressions & assignment statements, control statements, arrays in C (One dimensional). Introduction to Internet: Basic concepts of Internet.

RECOMMENDED READING:

Computer Fundamentals –Priti Sinha, Pradeep. K. Sinha

COURSE NAME: ENVIRONMENT & ECOLOGY - THEORY

COURSE CODE: OPT41110

CONTACT: 2

CREDIT: 2

COURSE OBJECTIVE:

The objective of the course is to:

- Learn multidisciplinary nature of environmental studies.
- Realize scope and importance of environmental sustainability and natural resource conservation.
- Analyse level & threats of biodiversity.
- Analyse causes, effects and control of air water, soil and marine pollution.
- Enrich with basics of municipal, bio-medical and e-waste management.

COURSE CONTENT:

Unit I

1. Introduction to environmental studies

•Multidisciplinary nature of environmental studies; •Scope and importance; Concept of sustainability and sustainable development.

Unit II

2. Ecology and Ecosystems

•Concept of ecology and ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem; food chains, food webs; Basic concept of population and community ecology; ecological succession. •Characteristic features of the following: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, wetlands, rivers, oceans, estuaries)

Unit III

3. Natural Resources

• Concept of Renewable and Non-renewable resources • Land resources and land use change; Land degradation, soil erosion and desertification. •Deforestation: Causes, consequences and remedial measures •Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). •Energy resources: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.

Unit IV

4. Biodiversity and Conservation

•Levels of biological diversity: genetic, species and ecosystem diversity; • Biogeographic zones



of India; Biodiversity patterns and global biodiversity hot spots •India as a mega-biodiversity nation; Endangered and endemic species of India •Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; •Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. •Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit V

5. Environmental Pollution

• Environmental pollution: concepts and types, • Air, water, soil, noise and marine pollution causes, effects and controls • Concept of hazards waste and human health risks • Solid waste management: Control measures of Municipal, biomedical and e-waste

Text/Reference Books:

1. Chokkan, K.B., Pandya, H. & Raghunathan, H. (eds). 2004. Understanding Environment. Sagar Publication India Pvt. Ltd., New Delhi.
2. Elliot, D. 2003. Energy, Society and Environment, Technology for a Sustainable Future. Routledge Press.
3. Guha, R. 1989. Ecological change and peasant resistance in the Himalaya. Unquiet Woods, Oxford University Press, Delhi.
4. Leopold, A. 1949. The Land Ethic. pp. 201-214. Chicago, USA.
5. National Research Council (NRC). 1996. Linking Science and Technology to Society's Environmental Goals. National Academy Press.
6. Pandit, M.K. 2013. Chipko: Failure of a Successful Conservation Movement. In: Sodhi, N. S. Gibson, L. & Raven, P.H. Conservation Biology: Voices from the Tropics. pp. 126-127. Wiley Blackwell, Oxford, UK.

COURSE NAME: PHYSICAL OPTICS - PRACTICAL

COURSE CODE: OPT41206

CONTACT: 4 (P)

CREDIT: 2

COURSE OBJECTIVE: After completing the course, the students will be able to:

- 1) Analyse the dual nature of the light.
- 2) Understand the different principle of reflection and refraction of light.
- 3) Analyse the different interference pattern of the light.
- 4) Interpret the light passing through different medium.
- 5) Understand the diffraction of light through different slit and medium

EXPERIMENTS TO BE PERFORMED:

1. To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism.
2. To determine the radius of curvature of convex surface of a lens by Newton's ring method.
3. To determine Planck's constant using photocell.
4. To study the diffraction through a single slit & to determine its width.
5. To determine the slit width & the separation between the slits of a double slit system from its Fraunhofer diffraction pattern.
6. Determination of the wavelength of monochromatic light using diffraction grating.
7. To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution.
8. To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating.

COURSE NAME: COMPUTER APPLICATION -PRACTICAL

COURSE CODE: OPT41208

**CONTACT: 4 (P)****CREDIT: 2****COURSE OBJECTIVE:**

The objective of the course is to:

- 1) Understand the basic computer architecture and binary conversion.
- 2) Analyse the different Boolean algebra and basic theorem of Boolean algebra.
- 3) Understand the demorgan theorem and its application.
- 4) Interpret the basic knowledge of C in different computer application.

COURSE CONTENT:

Operating System: Introduction & classification of software, working principle of the DOS (some basic internal & external commands).

Creating a file, batch processing. Autoexec Bat files. Windows & its components-Accessories, program manager, desktop icons.

MS- Office: Introduction of word processing-invoking MS-word – create, edit, save document, cut & paste perform operations on blocks of text, header & footer, Mail Merge, printer setup. Introduction of EXCEL. Concept of worksheet, making Charts & graphs, perform calculations & re calculations. C-Language: Overview of C, algorithm & flow chart, datatypes. Variables & constants, operators, expressions & assignment statements, control statements, arrays in C (One dimensional).

YEAR-II

SEMESTER-III

COURSE NAME: VISUAL OPTICS I - THEORY

COURSE CODE: OPT42101

CONTACT: 3L+1T

CREDIT: 4

COURSE OBJECTIVES:

After completing the course, the students will be able to

- 1) Understand the basic concept of vergence and its terminology.
- 2) Interpret the basic optics of the eye.
- 3) Evaluate the measurement of the optical constant of the eye.
- 4) Understand the refractive error of the eye.
- 5) Evaluating the different refractive anomalies of the eye.

COURSE CONTENT:

Unit Introduction 8 hours

1. Review of Geometrical Optics: Vergence and power

1.1 Conjugacy, object space and image space

1.2 Sign convention

1.3 Spherical refracting surface

1.4 Spherical mirror; catoptric power

1.5 Cardinal points

1.6 Magnification

1.7 Light and visual function

1.8 Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism

1.9 Aberration and application Spherical and Chromatic

Unit II Optics of Ocular Structure

2.1 Cornea and aqueous

2.2 Crystalline lens

2.3 Vitreous

2.4 Schematic and reduced eye.

Unit III Measurements of Optical Constants of the Eye

3.1 Corneal curvature and thickness

3.2 Keratometry

3.3 Curvature of the lens and ophthalmometry

3.4 Axial and axis of the eye

3.5 Basic Aspects of Vision.

3.5.1 Visual Acuity

3.5.2 Light and Dark Adaptation

3.5.3 Color Vision

3.5.4 Spatial and Temporal Resolution

3.5.5 Science of Measuring visual performance and application to Clinic.

Unit IV Refractive anomalies and their causes

4.1 Etiology of refractive anomalies

4.2 Contributing variability and their ranges

Unit V Populating distributions of anomalies.

4.4 Optical component measurements

4.5 Growth of the eye in relation to refractive errors

RECOMMENDED BOOKS:

1. Introduction to Visual Optics, Alan H. Tumadiffe (1987)

2. Clinical Optics- 2nd ed (1991)- A.R. Ellington & H.J. Frank B. Optometry Syllabus 17

3. Optics & Refraction-L.P. Agarwal.

COURSE NAME: MICROBIOLOGY AND PATHOLOGY - THEORY

COURSE CODE: OPT42103

CONTACT: 3L+1 T

CREDIT: 4

COURSE OBJECTIVE:

This course provides an overview of the essential knowledge and skills in Microbiology and Pathology to identify the disorders which is required for an optometry technician to perform their work effectively. It helps in applying the correct procedures to laboratory investigations and interpretation of tests in terms of the underlying pathology, as well as an understanding of the sensitivity, specificity and limitations of certain investigations. The candidates should demonstrate fundamental knowledge and insight into general microbiology and pathology. Knowledge and understanding should be demonstrated in the areas of general medical disorder and how they can affect (1) virology, (2) bacteriology, (3) mycology, (4) parasitology, and the eye. (5) inflammation and repair, (6) cardiovascular diseases and the eye, (7) blood diseases and the eye, (8) endocrine diseases and the eye, (9) neurological diseases and the eye, (10) nutritional disorders, (11) infectious diseases. (12) tumours, and (13) congenital and hereditary conditions.

COURSE CONTENT:

Unit I

1. Bacteria: Cell structure, elementary idea about classification and morphological basis. Staining reactions: Gram staining, spore staining, acid fast staining. Bacterial growth: nutritional requirements, physical factor affecting, culture media, and growth curve. Elementary idea about bactericidal agents: Phenol, alcohol. Sterilization (principles, types & methods). Pasteurization. Antibiotics: Bacteriostatic and bactericidal effects. **Unit**

II

2. Virus: elementary knowledge of viral-morphology, viral genome and classification, viral replication. Herpes viruses, hepatitis viruses, miscellaneous viruses, human immunodeficiency viruses. Microbial growth & death, Laboratory culture, host pathogen interactions, antimicrobial chemotherapy, pathogenic mechanisms common to external ocular infections process – clinical pathology.

Unit III

3. Physiology, pathology, treatment & epidemiology of infectious diseases caused by bacteria, virus, fungi & parasitic organisms with emphasis to disease with ocular manifestations & infectious eye diseases in hot climate as in India.

Unit IV

4. AIDS & eye- General Pathology Structure & function of immune system – Structure and function of thymus, spleen & red bone marrow- Immunity & its types, plasma proteins & immune reaction, cells involved in immune system. Humoral immunity theories of antibodies formation. Structure & function of lymph nodes. Structure & function of thymus, spleen & red bone marrow. Non-specific immunity, Antibody mediated immunity, specific immunity, cell modified immunity, Active immunity, Passive immunity. The acute inflammatory reaction – changes in acute inflammation, changes in the calibre of the blood vessels, changes in blood flow, changes associated with exudation. Local sequelae of acute inflammation. The chemical mediators of acute Inflammation & Repair: inflammation. Role of the mast cell in inflammation. Role of the platelets in inflammation. Chronic inflammation – cause, classification, general features. Source of infection. Transmission of organisms to the body. Wound infections.

5. Wound healing. Immuno-pathogenesis – type I, II, III & IV hypersensitivity. Mechanism of autoimmunity. Organ specific & non organ specific auto immune disease. The HLA system – histocompatibility complex. Pyogenic & bacterial infection. Giralto rejection-basic outline. 6. Disorder of growth – metaplasia, dysplasia, neoplasia. Circulatory disturbances – thrombosis, infarction, ischemia, embolism. Degeneration (calcification).

RECOMMENDED BOOKS:

Text Book of Microbiology –Anath Narayan Panikkar
Microbiology: Michael. J. Pelczar

COURSE NAME: LIGHTING AND THE EYE - THEORY

COURSE CODE: OPT42105

CONTACT: 3 L+1 T

CREDIT: 4

COURSE OBJECTIVES:

The objective of the course is

- 1) Understand the concept of Spectro dermic curve and photopic and scotopic vision.
- 2) Evaluate different quantities of light and its unit.
- 3) Understand the usage of different light sources and its application.
- 4) Interpret the VDU design and its application.

Eye and Vision: Spectro radiometric curve- $V\lambda$ - λ curve- photopic and scotopic vision CIE standard observes.
• Photometric quantities and units- Luminous Flux, Lumen- Illuminance, lux Luminous intensity, Candela – Luminance, Candela/m². Inverse square law and Cosine law of illumination (Illuminance). Photometry- Lumer Brod hum photometer, Guild Flicker photometer- Photocells photo multipliers – photodiodes-noise in physical photometers. Determination lighting of Polar curve of lamps.

• Light sources- Special energy distribution- luminous efficacy- color rendering properties- Flicker contracts. Day light, its properties- color lamp – Incandescent. lamps - low pressure Hg-lamps- High pressure Hg lamps- Low-pressure NA- lamp- High pressure NA-lamps- Typical applications. Lighting Installation- Luminaries their design function up lighting – down lighting mounting position- Choice of lighting equipment- lighting system management. Recommended level of illuminance for various including those in optometry and ophthalmology driving etc.

• VDU- Design of work station – Flicker color contrast- Regulations regarding the use of VDU.

• Eye Protectors- their constructions standard relating to eye protection

RECOMMENDED BOOKS:

Illumination Engineering, J. B. Murdoch.

COURSE NAME: CLINICAL REFRACTION - THEORY

COURSE CODE: OPT42107

CONTACT: 3 L+ 1T

CREDIT: 4 (45 HRS)

COURSE OBJECTIVE:

The main objective of the course is:

- 1) Evaluate and record the case history of patient with different eye condition.
- 2) Interpret the recording of visual acuity for distance and near.
- 3) To analyse the objective refraction of patient.
- 4) To list and interpret different subjective and binocular function test of patients.

COURSE CONTENT:

Unit I

1. Ophthalmic Case Historian: Demographic data, chief complaints, secondary complaints, ocular history, medical history, drugs and medications, family ocular history, family medical history, social history, review of system, few example of history writing.

Unit II

2. Recording Visual Acuity: Distance – Snellen's and log MAR. near-points/'M'/RS, use of Baily-lovie word reading chart.

Unit III

3. Objective Refraction: Streak Retinoscopy – all procedures to use streak retinoscope; static and dynamic retinoscopy, different methods of dynamic retinoscopy – MEM, Nott's, Sheard's, Low and high neutral, Bells, Cross, Taits. Other methods of retinoscopy-Radical, near (Mahendra), Chromoretinoscopy, String Lens bar, use of objective and autorefractor.

4. Subjective Refraction: Monocular Distance – Classic fogging, testing of astigmatism under fog fixed astigmatic dial (clock dial), rotary astigmatic dial, combination of fixed and rotary dial (Fan and Block test), J.C.C. Duo chrome or Bichrome, Binocular balancing – alternate occlusion, prism dissociation, dissociated duo chrome balance, Borish dissociated fogging, equalization

Unit IV

5. Binocular Distance – T.I.B. (Turville Infinity Balance), Polarized – Target and polarized filter, fogging. Near subjective refraction. Cycloplegic refraction, cycloidemia, sudden unfogging, Borish delayed spherical end point, pinhole estimation of refractive error, stenopaic slit refraction, measurement of vertex distance, distometer, use of subjective autorefractor. Different methods of measuring amplitude of accommodation. Correction of Presbyopia – Different methods of stimulation of tentative presbyopic addition – amplitude of accommodation, J.C.C., NRA-PRA balance, Bichrome, Plus Build-up, based on age, Dynamic retinoscopy. Occupational consideration, finalization of odd for near and intermediate different options of correction. Measurement of IPD and significance.

6. Final discussion with the patient.

Unit V

7. Writing prescription of power and counselling.

RECOMMENDED BOOKS:

1. Borish's clinical refraction – I. M. Borish, W. J. Benjamin – W. B. Saunders Co.
2. Primary care Optometry – Theodore – Butterworth-Heinemann.
3. Clinical Procedures in Optometry – Eskridge, Amos, Bartlett. -J. B. Lippincott Co.
4. The Ocular Examination: Measurement and Findings – Karla Zadnik.

COURSE NAME: OPHTHALMIC INSTRUMENTS AND PROCEDURE - THEORY

COURSE CODE: OPT42109

CONTACT: 3 L+ 1T

CREDIT: 4 (45 HRS)

COURSE OBJECTIVES:

The course objective of the patient

1. Explain the principal operations of binoculars, telescope, and projectors, simple and compound microscopes.
2. Interpret the function and working of different types of ophthalmoscopes, retinoscope and auto refractometer.
3. Understand the parts of slit lamp, keratometer and trial frame and cross cylinder and also its function.

COURSE CONTENT:

1. Detailed study of the principles of operation, types, optical properties, constructions, adjustments and applications of the following Instruments and Devices: • Binoculars, telescopes and projectors. • Simple and Compound Microscopes (with Huygens and Ramsden Eye pieces and oil immersion objectives).
2. Ophthalmoscopes- direct and indirect types. • Refractometers- Auto refractors, Dioptre
3. Retinoscopes - Standard Tests Charts.
4. Autorefractometer- subjective and objective types
5. Slit lamp Biomicroscope • Keratometer • Lensometer • Trial case lenses-best forms. • Trial frame design. • Cross cylinder.

RECOMMENDED BOOKS:

1. Introduction to Visual Optics, Alan H. Tumaiffie (1987)
2. Clinical Optics- 2nd ed (1991)- A.R. Ellington & H.J. Frank B. Optometry Syllabus 17
3. Optics & Refraction-L.P. Agarwal.
4. Clinical Optics- Borish.



COURSE NAME: CLINICAL REFRACTION - PRACTICAL

COURSE CODE: OPT42207

CONTACT: 4 P

CREDIT: 2

COURSE OBJECTIVES:

The main objective of the course is:

- 1) Evaluate and record the case history of patient with different eye condition.
- 2) Interpret the recording of visual acuity for distance and near.
- 3) To analyse the objective refraction of patient.
- 4) To list and interpret different subjective and binocular function test of patients.

COURSE CONTENT:

1. History writing
2. Recording VA
3. Practice of Streak Retinoscopy
4. Subjective refraction – fogging, clock dial, fan, JCC, prism balance, TIB, duochrome, cycloidemia, Slit refraction.
5. Measurement of amplitude of accommodation.
6. Presbyopic add Writing prescription.

COURSE NAME: OPHTHALMIC INSTRUMENTS AND PROCEDURE- PRACTICAL

COURSE CODE: OPT42209

CONTACT: 4P

CREDIT: 2

COURSE OBJECTIVES:

The course objective of the patient

- 1) Explain the principal operations of binoculars, telescope, and projectors, simple and compound microscopes.
- 2) Interpret the function and working of different types of ophthalmoscopes, retinoscope and auto refractometer.
- 3) Understand the parts of slit lamp, keratometer and trial frame and cross cylinder and also is function.

COURSE CONTENT:

- 1) Retinoscope
- 2) Ophthalmoscope
- 3) Slit Lamp Biomicroscopes
- 4) Keratometer
- 5) Lensometer

YEAR-II

SEMESTER-IV

COURSE NAME: DISPENSING OPTICS - THEORY

COURSE CODE: OPT42102

CONTACT: 3L+1 T

CREDIT: 4

COURSE OBJECTIVES:

Skills/knowledge to be acquired at the end of this course:

Measurement of lens power, lens centration using conventional techniques

Ophthalmic prism knowledge – effects, units, base-apex notation, compounding and resolving prisms.

Method of laying off the lens for glazing process.

Knowledge of prism and decentration in ophthalmic lenses

Knowledge of different types of materials used to make lenses and its characteristics

Knowledge lens designs – Bifocals and Progressive lens

Knowledge on tinted and protective lenses

Knowledge on special lenses like iseikonic, spectacle magnifiers.

Knowledge on spectacle frames – manufacture, materials.

COURSE CONTENTS:

Unit I

The characteristics of lens material properties (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, abbe value, centre thickness); Measurement of lens power; Quality control. Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection coating, UV coating, Hydrophobic coating, anti-static coating)

Unit II

Lens types single vision; Lens types bifocal / multifocal; Lens notation; Lens power and thick lenses; Effectivity and high-power lenses; Aberrations and lens design; Lens thickness.

Unit III

Ophthalmic prism; Absorptive lenses and lens coatings; Frames types and materials; Frame standard alignment and repairs done; Prescribing ophthalmic lenses; Facial Measurements; Frame Adjustment; Spectacle Delivery - on eye verification

Unit IV

Progressive lenses history and development; Prescribing PALs; Customized PAL designs; Dispensing PALs; Delivery of PALs; Troubleshooting PALs

Unit V

Pediatric Dispensing; Low Vision Aids; Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection coating, UV coating, Hydrophobic coating, anti-static coating)

Practical to be conducted along with theory lectures

Lab visit will be undertaken to demonstrate different lab procedures. Glazing and edging Hands on; A collection of different lens types and frames types should be done by students; Lens verification; Project report: lens and spectacle frames available in Indian market

RECOMMENDED 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. Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1972

COURSE NAME: VISUAL OPTICS – II – THEORY

COURSE CODE: OPT42104

CONTACT:3L+1T

CREDIT:4

**COURSE OBJECTIVES:**

The objective of the course is

1. Understand the basic refractive error of the eye and its anomalies.
2. Interpret the terminologies of accommodation and relationship of accommodation and convergences.
3. Evaluate the objective refraction of the eye and the subjective refraction of the eye.
4. Understand the effective power of spectacles and its effect.

COURSE CONTENTS:**Unit I Refractive conditions**

Myopia

Hyperopia

Astigmatism

Anisometropia and Aniseikonia

Presbyopia

Aphakia and Pseudophakia

Correction and Management of Amblyopia

Unit II Accommodation

Far and near point of accommodation

Range and amplitude of accommodation,

Anomalies of accommodation

Relationship between accommodation and convergence; A/c ratio

Unit III 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

Tutorials: Case discussion on difficult situations on Retinoscopy

RECOMMENDED BOOKS:

1. Abrams D: Duke elders Practice of Refraction, Edition 9, 1998
2. Primary Care Optometry- Theodore Grosvenor, 4th edition, Butterworth
3. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

COURSE NAME: OCULAR DISEASES – I – THEORY**COURSE CODE: OPT42106****CONTACT: 3L+1T****CREDIT: 4****COURSE OBJECTIVE:**

The objective of the course is to:

- 1) Understand the different diseases of orbit and its anomalies.
- 2) Evaluate the different congenital and inflammatory disorders of the lids.
- 3) Interpret the ocular conditions related to lacrimal system and conjunctiva.
- 4) Enlist different conditions of uvea and its anomalies.
- 5) Enumerate the different corneal conditions and its anomalies.

COURSE CONTENT:**Unit I Orbit**

1.1 Orbit Anatomy & Physiology

1.2 Proptosis (Classification, Causes, Investigations)

1.3 Enophthalmos

1.4 Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)

1.5 Orbital Inflammations (Pre-septal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)

1.6 Grave's Ophthalmopathy

1.7 Orbital tumours (Dermoid, capillary haemangioma, Optic nerve glioma)

1.8 Orbital blowout fractures

Unit II Lid

1 Lid Anatomy & Physiology

2.2 Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)

2.3 Oedema of the eyelids (Inflammatory, Solid, Passive edema)

2.4 Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum)

2.5 Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).

2.6 Tumours (Papilloma, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)

Unit III Lacrimal System & Conjunctiva 8 hours

3.1 Lacrimal System Anatomy & Physiology

3.2 Tear Film

3.3 The Dry Eye (Sjogren's Syndrome)

3.4 The watering eye (Etiology, clinical evaluation)

3.5 Dacryocystitis

3.6 Swelling of the Lacrimal gland (Dacryoadenitis)

4 Conjunctiva

4.1 Conjunctiva Anatomy & Physiology

4.2 Inflammations of conjunctiva (Infective conjunctivitis – bacterial, chlamydial, viral, Allergic conjunctivitis, Granulomatous conjunctivitis)

4.3 Degenerative conditions (Pinguecula, Pterygium, Concretions)

4.4 Symptomatic conditions (Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration)

4.5 Cysts and Tumours

Unit IV Cornea 8 hours

5.1 Cornea Anatomy and Physiology

5.2 Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea)

5.3 Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative

5.4 Etiological classifications: Infective, Allergic, Tropic, Traumatic, Idiopathic))

5.5 Degenerations (classifications, Arcus senilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration)

5.6 Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy)

5.7 Keratoconus, Keratoglobus

5.8 Corneal oedema, Corneal opacity, Corneal vascularisation

5.9 Penetrating Keratoplasty

Unit V: Uveal Tract and Sclera

6.1 Anatomy and Physiology of Uvea

6.2 Uveitis

6.3 Etiology

6.4 Pathology

6.5 Anterior Uveitis

6.6 Posterior Uveitis

6.7 Purulent Uveitis

6.8 Endophthalmitis

- 6.9 Pan ophthalmitis
- 6.10 Pars Planitis
- 6.11 Tumours of uveal tract (Melanoma)
- 6.12 Episcleritis and scleritis
- 6.13 Clinical examination of Uveitis and Scleritis

REFERENCE BOOKS:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
2. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007

COURSE NAME: OPHTHALMIC IMAGING AND ELECTRODIAGNOSTIC PROCEDURES - THEORY

COURSE CODE: OPT42108

CONTACT: 3L+1T

CREDIT:4

COURSE OBJECTIVE:

The objective of the course is to familiarize the student with the Electrophysiology Laboratory which performs several clinical tests, including the electroretinogram (ERG), electro-oculogram (EOG), visual evoked response (VER), color vision testing (CVT) and dark adaptometry (DA).

Identify corneal interface disease with imaging technology

Examine diagnostic capabilities of imaging for glaucoma

Analyze imaging data for change to determine when to escalate treatment for glaucoma in response to progression by imaging

Examine current imaging printouts to see how they can help diagnose retinal diseases at an earlier stage

Analyze the different OCT imaging platforms based upon their differences in hardware and software design for optimal ophthalmic care

COURSE CONTENTS:

Unit I Electrophysiological investigations

Electro-oculogram (EOG) Measurement of retinal function with standardised eye movements.

Electroretinogram (ERG)

Macular or Focal Electroretinogram

Pattern Electroretinogram (PERG)

Flash Visually Evoked Cortical Potential (Flash VEP)

Pattern Appearance Visually Evoked Cortical Potential

Other non-standard procedures for recording VEP and ERG e. g., measurement of interocular beat frequencies, flicker and sweep VEPs, multi-focal ERG, fast oscillation.

Electromyogram (EMG)

Electro-nystagmo graphy. For measurement of nystagmus and eye movements.

Unit II Indications for Patient Referral

Tests Available

Patterns of Referral

Indications for Specific Tests

Standardised Electroretinogram, Electro-Oculogram and Visually, Evoked Potential

Unit III Anterior segment imaging:

Orbscan: Basic science and clinical application.

Anterior Segment OCT: Principle and Interpretation.

Corneal Topography

Ophthalmic Photography: External eye photography, Slit lamp photography,



Unit IV Glaucoma Imaging:

Imaging of the optic nerve head: Basic science behind optic nerve head damage. Principle & role of different imaging system behind optic nerve head evaluation. (GDx, HRT)

Retinal Imaging:

B- Scan

Fundus photography,

Basic science and role of OCT (Stratus and Spectral domain OCT) in retinal diagnosis.

Auto fluorescence and fundus fluorescence Angiogram: Optical Principle and basic science, Procedure, Role of angiogram in retinal diagnosis and clinical decision making.

RECOMMENDED BOOKS:

1. HV Nema, Nitin Nema, Diagnostic procedure in Ophthalmology, Jaypee, second edition 2009.
2. David B. Henson, Optometric Instrumentation, Butterworths
3. Roger Steinert and David Huang, Anterior Segment Optical Coherence Tomography, Slack Incorporated.2008
4. Carmen A polianite, Michael R. hee Optical Coherence Tomography of Ocular disease,
5. David B. Henson, Optometric Instrumentation, Butterworths.
6. Bruce Muchnik, Clinical Medicine in Optometric practice, Mosby Elsevier 2008.
7. MAcRae. S, Krueger, R., Applegate, R.A. (2004) Wavefront Customized Visual Correction-the quest for super vision-II. London: Slack Inc.
8. Ophthalmic Electrodiagnosis (Major Problems in Ophthalmology) N.R. Galloway

COURSE NAME: GERIATRIC OPTOMETRY & PEDRIATRIC OPTOMETRY - THEORY

COURSE CODE: OPT42110

CONTACT:2L

CREDIT: 2

GERIATRIC OPTOMETRY:

COURSE OBJECTIVES:

The student on taking this course should:

1. Be able to identify, investigate the age-related changes in the eyes.
2. Be able to counsel the elderly
3. Be able to dispense spectacles with proper instructions.
4. Have adequately gained knowledge on common ocular diseases.

COURSE CONTENTS:

Unit I

Structural, and morphological changes of eye in elderly; Physiological changes in eye in the course of aging.

Unit II

Introduction to geriatric medicine – epidemiology, need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)

Unit III

Optometric Examination of the Older Adult; Ocular diseases common in old age with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye

Unit IV

Contact lenses in elderly; Pharmacological aspects of aging; Low vision causes, management and rehabilitation in geriatrics; Spectacle dispensing in elderly – Considerations of spectacle lenses and frames

REFERENCE BOOKS:

1. A.J. ROSSENBLOOM Jr & M.W. MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.
2. OP Sharma: Geriatric Care – A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005



3. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
4. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

PEDIATRIC OPTOMETRY:

COURSE OBJECTIVES:

At the end of the course the student is expected to:

- Have a knowledge of the principal theories of childhood development, and visual development
- Have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues
- Be familiar with the accommodative-vergence system, the genesis of ametropia, the disorders of refraction, accommodation and vergence, and the assessment and management of these disorders
- Be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus
- Have a knowledge of the epidemiology of eye disease in children, the assessment techniques available for examining visual function of children of all ages and an understanding varied management concepts of paediatric vision disorders
- Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.
- Have a capacity for highly evolved communication and co-management with other professionals involved in pediatric assessment and care

COURSE CONTENTS:

Unit I:

The Development of Eye and Vision; History taking Paediatric subjects; Assessment of visual acuity; Normal appearance, pathology and structural anomalies of Orbit, Eye lids, Lacrimal system, Conjunctiva, Cornea, Sclera, Anterior chamber, Uveal tract, Pupil, Lens, Vitreous and Fundus

Unit II

Oculomotor system, Refractive Examination; Determining binocular status; Determining sensory motor adaptability

Unit III

Compensatory treatment and remedial therapy for: Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia; Remedial and Compensatory treatment of Strabismus and Nystagmus

Unit IV

Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular; conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics; Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism

Unit V

Spectacle dispensing for children; Paediatric contact lenses

REFERENCE BOOKS:

1. Paediatric Optometry - JEROME ROSNER, Butterworth, London 1982
2. Paediatric Optometry – William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004
3. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C. V Mosby Co. St. Louis, 1980.
4. Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
5. Clinical pediatric optometry. L J Press, B D Moore, Butterworth- Heinemann, 1993

COURSE NAME: DISPENSING OPTICS - PRACTICAL

Barrackpore-Barasat Rd, 24 Parganas North, Jagannathpur, Kolkata, West Bengal-700126



COURSE CODE: OPT42202

CONTACT: 4P

CREDIT: 2

COURSE OBJECTIVE:

Skills/knowledge to be acquired at the end of this course:

Measurement of lens power, lens centration using conventional techniques

Ophthalmic prism knowledge – effects, units, base-apex notation, compounding and resolving prisms.

Method of laying off the lens for glazing process.

Knowledge of prism and decentration in ophthalmic lenses

Knowledge of different types of materials used to make lenses and its characteristics

Knowledge lens designs – Bifocals and Progressive lens

Knowledge on tinted and protective lenses

Knowledge on special lenses like iseikonic, spectacle magnifiers.

Knowledge on spectacle frames – manufacture, materials.

List of Experiments:

a) Find out the median & optical centre of ophthalmic lens

b) Neutralization – manual

c) Identification of lens-spherical, cylindrical & sphero-cylindrical lenses

d) Marking of single vision, bifocal, progressive

e) Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification

f) Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler. Common difficulties in measuring P.D, measuring monocular P.D, measuring near C.D.

g) Measuring heights: - single vision, bifocal, multifocal, progressive h) Pediatric dispensing: - Frame selection & marking

COURSE NAME: OPHTHALMIC IMAGING AND ELECTRO DIAGNOSTIC PROCEDURES - PRACTICAL

COURSE CODE: OP4T2208

CONTACT: 4P

CREDIT: 2

COURSE OBJECTIVES

The objective of the course is to familiarize the student with the Electrophysiology Laboratory which performs several clinical tests, including the electroretinogram (ERG), electro-oculogram (EOG), visual evoked response (VER), color vision testing (CVT) and dark adaptometry (DA).

Examine diagnostic capabilities of imaging for glaucoma

Analyze imaging data for change to determine when to escalate treatment for glaucoma in response to progression by imaging

Examine current imaging printouts to see how they can help diagnose retinal diseases at an earlier stage

Analyze the different OCT imaging platforms based upon their differences in hardware and software design for optimal ophthalmic care

List of Experiments:

To interpret of report of different electrophysiological test ERG, EOG, OCT.

To interpretation of report of different glaucoma evaluation.

To interpretation of report of different retina evaluation.

To interpretation of report of different optic nerve evaluation.

REFERENCE BOOKS:



1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002
2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997.

YEAR-III

SEMESTER- V

COURSE NAME: CONTACT LENS I - THEORY

COURSE CODE: OPT43101

CONTACT: 3 L+1 T

CREDIT: 4

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to:

1. Understand the basics of contact lenses
2. List the important properties of contact lenses
3. Finalise the CL design for various kinds patients
4. Recognize various types of fitting
5. Explain all the procedures to patient
6. Identify and manage the adverse effects of contact lens

COURSE CONTENTS:

Unit I

Anatomy and physiology of anterior segment, History of contact lenses, Optics of contact lenses, comparison spectacles, Contact lens designs, Corneal oxygenation in contact lens wear

Unit II

Contact lens fabrication, Manufacturing of Rigid and soft Contact Lenses –Various methods

Pre fitting examination-steps, significance, recording of results, Instruments used for examination, Special investigation in pre-fitting examinations., Keratometry and corneal topography, Slit lamp examination, Discussion with patient, choice of lens type

Unit III

Examining the Prospective Contact Lens Patient, Selecting Lens Type, Wear Mode and Replacement Rate, Fitting Spherical GP Contact Lenses, Fitting Spherical Soft Contact Lenses, Correcting Astigmatism with Contact Lenses

Unit IV

Calculation and finalizing of contact lens parameters, ordering contact lenses – writing a prescription to the laboratory, Checking and verifying contact lenses from laboratory, Modifications possible with rigid lenses

REFERENCE BOOKS:

1. IACLE modules A1 - 6, B2-9, C 1-4
 2. CLAO Volumes 1, 2, 3
 3. Text book of Contact Lenses 5th edition by Sinha Rajesh, Jaypee publication 2017
 4. Contact lens Primer: Jaypee Bros: Monica Chaudhry
 5. Anthony J. Phillips: Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
 6. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
- E S. Bennett, V A Henry: Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

COURSE NAME: BINOCULAR VISION I - THEORY

COURSE CODE:OPT43103

CONTACT: 3 P+1T

CREDIT: 4

COURSE OBJECTIVES:

The main objective of the course is

1. Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.
2. Provide a detailed explanation of, and differentiate between the aetiology, investigation and management of binocular vision anomalies.



3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.
4. Evaluate different sensory adaptation of patients with different binocular anomalies.

COURSE CONTENTS:

Unit I

Binocular Vision and Space perception; Relative subjective visual direction; Retino motor value; Grades of BSV; SMP and Cyclopean Eye; correspondence, Fusion, Diplopia, Retinal rivalry; Horopter; Physiological Diplopia and Suppression; Stereopsis, Panum's area, BSV

Unit II

Revision: Anatomy of Extra Ocular Muscles; Physiology of Ocular movements; Center of rotation, Axes of Fick; Action of individual muscles

Unit III

Laws of ocular motility; Donder's and Listing's law; Sherrington's law; Hering's law; Uniocular & Binocular movements - fixation, saccadic & pursuits; Version & Vergence; Fixation & field of fixation

Unit IV

Near Vision Complex; Accommodation: Definition and mechanism (process), Methods of measurement, Stimulus and innervation, Types of accommodation, Anomalies of accommodation – aetiology and management; Convergence: Definition and mechanism, Methods of measurement, Types and components of convergence - Tonic, accommodative, fusional, proximal, Anomalies of Convergence – aetiology and management.

Unit V

Sensory adaptations: Confusion, Suppression, Investigations, Management, Blind spot syndrome; Abnormal Retinal Correspondence, Investigation and management; Eccentric Fixation, Investigation and management; Amblyopia: Classification and management

REFERENCE BOOKS:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers
3. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
4. Gunter K. von Noorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company
5. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers.

COURSE NAME: OCULAR DISEASES II - THEORY

COURSE CODE: OPT43105

CONTACT:3L+1T

CREDIT: 4

COURSE OBJECTIVE:

The main objective of the course is

- 1) Evaluate the various congenital and pathological anomalies of retina and vitreous.
- 2) Understand the various ocular injuries and its causes.
- 3) Evaluation of different uveal tract and scleral anomalies
- 4) Enumerate different clinic neural and optic nerve diseases.
- 5) Understand the mechanism and functioning of glaucoma and its complications.

COURSE CONTENTS:

Unit I Retina and Vitreous:

Applied Anatomy; Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibres; Persistent Hyaloid Artery) ; Inflammatory disorders (Retinitis: Acute purulent ,



Bacterial, Virus, mycotic); Retinal Vasculitis (Eales's); Retinal Artery Occlusion (Central retinal Artery occlusion); Retinal Vein occlusion (Ischaemic, Non Ischaemic , Branch retinal vein occlusion); Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations; Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular oedema, Age related macular degeneration; Retinal Detachment: Rhegmatogenous, Tractional, Exudative); Retinoblastoma; LASERS in Ophthalmology; Fluorescein angiography; OCT

Unit II Ocular Injuries:

Terminology: Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury); Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis); Non-Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational); Clinical approach towards ocular injury patients

Unit III Uveal Tract & Sclera

Applied Anatomy; Classification of uveitis; Etiology; Pathology; Anterior Uveitis; Posterior Uveitis; Purulent Uveitis; Endophthalmitis; Pan ophthalmitis; Pars Planitis; Tumours of uveal tract (Melanoma); Episcleritis and scleritis; Clinical examination of Uveitis and Scleritis

Unit IV Clinical Neuro-ophthalmology

Anatomy of visual pathway; Lesions of the visual pathway; Pupillary reflexes and abnormalities; Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus Gunn pupil, Argyll Robertson pupil, Adie's tonic pupil); Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy; Cortical blindness; Malingering; Nystagmus; Clinical examination

Unit V Glaucoma

Applied anatomy and physiology of anterior segment; Clinical Examination; Definitions and classification of glaucoma; Pathogenesis of glaucomatous ocular damage; Congenital glaucoma; Primary open angle glaucoma; Ocular hypertension; Normal Tension Glaucoma; Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure); Secondary Glaucoma; Management : common medications, laser intervention and surgical techniques; Glaucoma investigations and procedures; Confrontation Amsler grid; Tonometry- Applanation, Schiotz; Visual fields-; GTX,HRT; Provocative test; OCT

REFERENCE BOOKS:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international (p) Ltd. Publishers, New Delhi, 2007
 2. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007

COURSE NAME: PUBLIC HEALTH & COMMUNITY OPTOMETRY – THEORY

COURSE CODE: OPT43107

CONTACT: 3L+1 T

CREDIT: 4

COURSE OBJECTIVE:

The objective of the course is to:

- 1) Understand the concept of public health in eye care delivery system.
- 2) Evaluate the policies relating to eye care and its delivery system.
- 3) Enumerate the points related to ocular emergencies.

COURSE CONTENT:

Module:1

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

Module:2

- Health Policies relating to optometry



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

Module:3

- Ocular emergencies – a) Foreign body b) Eye Pain c) Watering d) Injuries-perforating, non-perforating & chemical 9. Role of International organization and NGOs in eye care

Suggested Readings: PREVENTIVE AND SOCIAL MEDICINE BY K. PARK

COURSE NAME: LAWS, REGULATIONS AND OPTOMETRY - THEORY

COURSE CODE: OPT43109

CONTACT: 3L+1 T

CREDIT: 4

COURSE OBJECTIVES:

The main objective of the course is

- 1) Understand the concept of business management, practice management and uses of computer.
- 2) Explain the accounting principles and source of finance.
- 3) Evaluate the professional values and ethics in optometry.
- 4) Understand the medical code of conduct required to govern the profession.

COURSE CONTENT:

Unit I

Business Management:

Practice establishment and development

Stock control and costing

Staffing and staff relations

Business computerization

Unit II

Accounting Principles

Sources of finance

Bookkeeping and cash flow

Taxation and taxation planning

Unit III

Professionalism and Values

Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality

Personal values- ethical or moral values

Attitude and behaviour- professional behaviour, treating people equally

Code of conduct, professional accountability and responsibility, misconduct

Differences between professions and importance of team efforts

Cultural issues in the healthcare environment.

Unit IV

Few of the important and relevant topics that need to focus on are as follows:

Medical ethics - Definition - Goal - Scope b

Introduction to Code of conduct

Basic principles of medical ethics –Confidentiality

Malpractice and negligence - Rational and irrational drug therapy

Autonomy and informed consent - Right of patients

COURSE NAME: CONTACT LENS I - PRACTICAL

COURSE CODE: OPT43201

CONTACT: 4 P

CREDIT 2

COURSE OBJECTIVES:



Upon completion of the course, the student should be able to:

1. Understand the basics of contact lenses
2. List the important properties of contact lenses
3. Finalise the CL design for various kinds patients
4. Recognize various types of fitting
5. Explain all the procedures to patients.

COURSE CONTENT:

History Taking role plays,
Pre fitting evaluation,
Soft CL insertion & Removal,
Fitting assessment
Over refraction,
Follow up examination,
Patient instructions,
Contact Lenses Do's and don'ts,
Instructions for care and maintenance.

COURSE NAME: BINOCULAR VISION I - PRACTICAL

COURSE CODE: OP43203

CONTACT: 4P

CREDIT: 2

COURSE OBJECTIVE:

1. Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.
2. Provide a detailed explanation of and differentiate between the aetiology, investigation and management of binocular vision anomalies.
3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.
4. Evaluate different sensory adaptation of patients with different binocular anomalies.

EXPERIMENTS:

Binocular vision assessment,
Stereopsis evaluation,
Measurement of NPC and NPA,
Measurement of AC/A Ratio,
Measurement of convergence,
Convergence insufficiency and management of cases,
ARC- case discussion,
Eccentric fixation –Diagnosis and discussion,
Amblyopia management –case presentation.

YEAR-III

SEMESTER-VI

COURSE NAME: CONTACT LENS II - THEORY

COURSE CODE: OPT43102

CONTACT: 3L+1T

CREDIT:4

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to:

1. Review the basics of contact lenses
2. List the important properties of contact lenses
3. Finalise the CL design for various kinds patients
4. Recognize various types of fitting
5. Explain all the procedures to patient
6. Identify and manage the adverse effects of contact lens

COURSE CONTENTS:

Unit I

Pre-fitting examination

Review of Basics; Patient Selection; Pre-screening for contact lens wear; Slit Lamp examination; Assessment of Cornea; Assessment of Tear film

Unit II

Contact lens fitting

Soft contact lens fitting; Soft Toric Contact Lens fitting; Rigid Contact lens fitting; Managing the Presbyope

Unit III

Extended wear contact lens

Cornea and Oxygen; Extended Wear and Silicone Hydrogel Lenses

Unit IV

Contact lens care

Contact lens After Care; Contact lens Care System

Unit V

Speciality contact lens

Therapeutic and Prosthetic contact lenses; Overview of Special considerations for fitting contact lenses; Business Aspects of Contact lens practice; Setting up a Contact lens clinics

Assignment: The student should consult all the manufacturers of RGP lenses and soft lenses and list down various products (Lenses, care products and accessories) available with them. Detailed parameters along with manufacturer recommendation should be noted. Also, students will be encouraged to read books and journals and submit a report to the faculty. The topics of the same can be decided by the faculty.

REFERENCE BOOKS:

1. IACLE modules 1 – 10
2. Essential Contact Lens practice: Jane Veys, John Meyler, Ian Davies
3. CLAO Volumes 1, 2, 3
4. Anthony J. Phillips: Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
5. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
6. E S. Bennett, V A Henry: Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008
7. Contact lens Primer: Monica Chaudhry: Jaypee Brothers

COURSE NAME: BINOCULAR VISION II - THEORY

COURSE CODE: OPT43104

CONTACT: 3L+1T

CREDIT:4

COURSE OBJECTIVE:

The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose case of strabismus with comments in respect to retinal correspondence and binocular single vision. The student should be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

COURSE CONTENTS:

Unit I

Strabismus - Definition, Classification and etiology; Development of squint or ocular deviation; Adaptation to development of ocular deviation; Orthoptic instruments and their uses; Methods of examination

Unit II

Anomalous Retinal Correspondence (ARC); Suppression; Amblyopia and eccentric fixation; Definition & Classification; Investigations; Management

Unit III

Latent Strabismus (Heterophoria); Esotropia; Accommodative esotropia; Partially accommodative esotropia; Non accommodative esotropia; Microtropia; Recurrent esotropia; Secondary esotropia; Management of esotropia; esotropia associated with vertical deviation; Exotropia; Classification and etiology; Primary exodeviation; Dissociated exodeviation; Secondary exodeviation; Cyclo - Vertical Deviation; Comitant hyper deviation; Dissociated vertical deviation; Dissociated horizontal deviation; Elevation in adduction; Depression in adduction; Cyclodeviation

Unit IV

A and V pattern; Paralytic Strabismus; Genetics and occurrence of squint and binocular vision problems; Special Forms of Strabismus; Retraction syndrome (Duane syndrome); Brown syndrome; Adherence syndrome; Strabismus fixus; Strabismus in high myopes; Fibrosis of extra ocular muscles; Graves' Endocrine ophthalmopathy; Acute orbital myositis; Cyclic heterotropia; Acquired motor fusion deficiency; Fracture of orbital floor; Fracture of medial orbital floor; Ocular Myasthenia gravis; Chronic progressive external ophthalmoplegia (Ocular myopathy of Von Graefe)

Unit V

Nystagmus; Principle of non-surgical treatment; Optical treatment; Pharmacological treatment; Orthoptics; Chemo denervation of extra ocular muscles – Botulinum Toxin; Principle of surgical treatment; Vision Training Programme (VTP)

RECOMMENDED BOOKS:

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Gunter K. von Noorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers

COURSE NAME: RESEARCH METHODOLOGY & BIOSTATISTICS - THEORY

COURSE CODE: OPT43106

CONTACT: 2L

CREDITS: 2 (30 HOURS)

COURSE OBJECTIVE:

- a) The objective of the course is to introduce early career researchers to the methodology, methods and techniques of research.
- b) The course aims to present research as a dynamic process beginning from questions to answers, showing clearly how researchers progress from one stage to the next.
- c) To understand some basic concepts of research and its methodologies.

Module I

Overview and orientation of the course: What constitutes research? An overview of history of mankind and the centrality of human beings (anthropocentrism). Understanding basic concepts of research such as Ontology, Epistemology, Methodologies and Methods.

Module II

Meaning and Objectives, Types of Research - Basic and Applied Researches. Research Approaches - Discrete vs Analytical Research, Applied vs Fundamental Research, Qualitative vs Quantitative Research, Conceptual vs Experimental (or Empirical) Research. Steps in Research Process. Research Methods and Methodology - Criteria for Good Research - Research Objectives.

Module III

Selecting and defining a research problem: What is research problem, selecting the problem, necessity of defining the problem, technique involved in defining a problem, Hypothesis and its functions. Research Design: Meaning of research design, need for research design, features of a good design, important concepts relating to research design, different research designs, basic principles of experimental designs, important experimental designs.

Module IV

Literature Review: What is literature review? Significance of Literature Review. Steps in Conducting Literature Review - Guidelines on Style, Mechanics and language usage - Writing up to the literature Reviewed - Some Examples. Design of Experiments: Types of Experiments - Experimental Design Factors Experimental Design Protocol Numerical and Analytical Experiments - Computer Simulation and Software usage.

Module V

Data Collection and Sampling: Types of data, Different Approaches of Data Collection, Collection of primary and secondary data, General procedure for data collection observation method, interview method, data collection through questionnaires and schedules. Sampling: Different sampling techniques and sample size. Scaling: importance scaling, different scaling techniques. Data Analysis: Data Errors - Identification of Data Errors - Causes and Types of Data Errors. Error Analysis - Evaluation of uncertainties for complicated Data Reduction. Statistical Analysis of Experimental Data.

Module VI

Introduction to statistics, Calculation and interpretation of various measures like mean, median, standard deviations, Skewness and Kurtosis. Probability distribution, Correlation and regression, Significance tests and confidence intervals, Frequency distribution, Frequency polygon, Bar diagram, Histogram, Frequency distribution curve, CF & CP, Ogive, Percentile & Quartiles.

Module VII

Parametric tests – Test for single proportion, Test for Equality of proportions, Test for single mean, Test for equality of means • ANOVA: - One way, Two way • Non parametric tests – Chi-square tests, Fisher's exact test, McNemar test, Mann Whitney U-test, Median test, Sign test, Wilcoxon test. Collection, presentation and analysis of hospital statistical data with examples. Collection, presentation and analysis of Optometric and ophthalmologic data with a few examples.

References:

- 1) Research Methodology - Methods and Techniques by C.R. Kothari New Age International (P) Ltd.
- 2) Experimental Methods for Engineers by J.P. Holman TMH
- 3) Engineering Research Methodology by Krishnan Nallaperumal
- 4) Experimental Design & Methodology by Rafal Kicing R. Paul Wiegand
- 5) Research Methodology -Handout on Literature Review (Personal Communication)

COURSE NAME: LOW VISION AID & VISUAL REHABILITATION – THEORY

COURSE CODE: OPT43108

CONTACTS HOURS / WEEK: 3L+1T

CREDIT: 4

COURSE OBJECTIVE:

The main Objective of the course is

- 1) Enumerate the definition of low vision and its epidemiology and terminology of low vision.
- 2) Interpretation of Magnification in the field of low vision.
- 3) Evaluation of patient with low vision.
- 4) Explain rehabilitation of low vision patients.

Module:1 - a) Definition-old, new, proposed b) Grades of low vision c) Epidemiology & Terminology of Low Vision

Module:2 – 1. Low vision optics Magnification 2. Optics of Galilean & Keplerian telescope-advantage/disadvantage, significance of exit & entrance pupil 3. Optics of spectacle magnifier –Determination of add 4. Optics of stand & hand magnifier 5. Electronic magnifier.

Module:3 - 1. Low vision examination: visual acuity, refraction, field testing, color vision, contrast sensitivity and glare testing 2. Assessment & prescription of low vision devices-optical, non-optical & rehabilitation

Module:4 – 1. Overview of Rehabilitation Services 2. Overview of systematic / retinal diseases in relation to low vision 3. Counselling of low vision patient/ parents/ guardians/relatives

SUGGESTED READINGS:

1. THE ART & PRACTICE OF LOW VISION, BY FREEMAN & JOSE, BUTTERWORT PUB.
2. UNDERSTANDING LOW VISION, AFB PUBLICATION
3. LOW VISION, BY FAYEA E.E.
4. LOW VISION PRACTICE- MONIKA CHOUDHURY

COURSE NAME: CONTACT LENS II - PRACTICAL

COURSE CODE: OPT43202

CONTACT: 4P

CREDIT: 2

Pre fitting evaluation;

RGP CL insertion & Removal;

Fitting assessment;

Over refraction;

Follow-up Examination;

Toric contact lens fitting and assessment;

Cosmetic contact lens fitting and assessment;

Dos and don'ts for contact lenses;

Care and maintenance;

Special instructions for silicone hydrogels;

Demonstration for bifocal, multifocal lenses, scleral lenses, Orthokeratology;

Patient communication workshop / role plays;

Visit to contact lens manufacturing unit,

Case Presentations (components of Practical exam);

Video preparations (components of Practical exam)



COURSE NAME: BINOCULAR VISION II - PRACTICAL

COURSE CODE: OPT43204

CONTACT: 4P

CREDIT: 2

The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose case of strabismus with comments in respect to retinal correspondence and binocular single vision. The student should be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

EXPERIMENTS:

1. History taking –Role play;
2. Ocular motility demonstration testing: Broad H Test
3. Demonstration of following Orthoptic instruments/methods and their uses:
 - i. Prism Bar
 - ii. Synoptophore
 - iii. Maddox Rod
 - iv. Maddox Wing
 - v. RAF Ruler
 - vi. Cover Test
 - vii. Hirschberg Test
 - viii. Krimsky & Modified Krimsky Test
 - ix. Diplopia Charting
 - x. Accommodative Flippers
4. Case discussion different types of strabismus
5. Orthoptic Investigative & Therapeutic Procedure
6. Visit to clinic and record cases

COURSE NAME: LOW VISION AND VISUAL REHABILITATION - PRACTICAL

COURSE CODE: OPT43208

CONTACT: 3 L+ 1 T

CREDIT:4

COURSE OBJECTIVE:

The main Objective of the course is

- 1) Enumerate the definition of low vision and its epidemiology and terminology of low vision.
- 2) Interpretation of Magnification in the field of low vision.
- 3) Evaluation of patient with low vision.
- 4) Explain rehabilitation of low vision patients.

TOPICS TO BE DONE:

- a) Case history.
- b) Assessment.
- c) Application of devices.
- d) Rehabilitation.

Specific areas of instruction learned by Vision Rehabilitation Therapists will include:

Communication Systems (Braille, handwriting, recording skills, use of electronic reading systems, use of assistive technology and computer access technology, etc.).

Personal Management (grooming, hygiene, clothing organization, medical measurement, socialization skills, etc.)

Home Management (organization and labelling, repair and home maintenance, budgeting and record keeping, etc.)



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Activities of Daily Living (cooking, cleaning, shopping, safety, money organization and management, etc.)

Leisure and Recreation (hobbies, woodworking, crafts, sports, etc.)

Psychosocial Aspects of Blindness and Vision Loss

Medical Management (assessment and instruction and training of adaptive medical equipment)

Basic Orientation and Mobility Skills (sighted guide, safety techniques, etc.)

YEAR-IV

SEMESTER-VII



COURSE NAME: PROJECT DISSERTATION

COURSE CODE: OPT44101

CONTACT:

CREDIT: 8

COURSE NAME: INTERNSHIP

COURSE CODE: OPT44103

CONTACT:

CREDIT: 6

YEAR-IV

SEMESTER-VIII



COURSE NAME: INTERNSHIP

COURSE CODE: OPT44102

CONTACT:

CREDIT: 6

COURSE NAME: COMPREHENSIVE VIVA VOCE

COURSE CODE: OPT44104

CONTACT:

CREDIT: 8