

***Detail syllabus Integrated Masters Optometry
(M. OPT)***

School of Medical Sciences

Vision Statement:

School of Medical Sciences of the University of Hyderabad will strive and endeavor to Become an internationally reputed state of art professional, academic, research and clinical entity including a health provider through excellent clinical, and health services, teaching, research and capacity building. This will contribute to the health of the society by training students and researchers who can transform the practice of medicine in the country and region.

Mission Statements:

We achieve our vision in the following manner

Mission Statement



Program Learning Objectives (PLOs)

At the completion of this course, the student should be able to:

PLO 1	Possess and acquire scientific knowledge to work as an eye and health care professional
PLO 2	Demonstrates and possesses clinical skills to provide quality eye and health care services
PLO 3	Demonstrate team work skills to support shared goals with the interdisciplinary health care team to improve societal health
PLO 4	Possesses and demonstrates ethical values and professionalism within the legal framework of the society
PLO 5	Communicate effectively and appropriately with the interdisciplinary health care team and the society
PLO 6	Demonstrate high quality evidence based practice that leads to excellence in professional practice
PLO 7	Enhance knowledge and skills with the use of advancing technology for the continual improvement of professional practice
PLO 8	Display entrepreneurship, leadership and mentorship skills to practice independently as well as in collaboration with the interdisciplinary health care team
PLO 9	To take up research in specialized fields of optometry and vision sciences

Qualification Descriptors (QDs)

Below qualification descriptors are the outcomes of Optometry program at University of Hyderabad. After completing the program, the graduates will be able to:

QD 1	<i>Clinical Care, Ethics & Accountability:</i> use a patient centric approach and best evidence to provide primary eye and health care services including follow-up care within the scope of global optometry competency guidelines by understanding the core concepts of clinical ethics and law of the land, implement the prescribed preventive, investigative, management plans and practice as a primary eye care practitioner
QD 2	<i>Multidisciplinary teams & Communication:</i> Effectively communicate within and inter-disciplinary teams collaboratively to accomplish shared goals within and across settings to achieve coordinated, high quality care. In addition, communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately.
QD 3	<i>Commitment to professional excellence:</i> Execute professionalism including technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare.
QD 4	<i>Leadership:</i> take-up the leadership roles where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services.
QD 5	<i>Social accountability & Responsibility:</i> accountable and responsible towards community by addressing the priority of the eye health concerns. Judiciously manage resources within the health care system and to acknowledge their social accountability.
QD 6	<i>Scientific Attitude & Lifelong learning:</i> Utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives. And will learn to continuous improve their skills and knowledge while harnessing modern tools and technology

Integrated Masters in Optometry Course Structure					
Codes	Courses	Credits	Codes		Credits
First Semester			Second Semester		
OV103	General Anatomy	2	OV152	Ocular Anatomy	2
OV104	General Physiology	2	OV153	Ocular Physiology	2
OV105	General Biochemistry	3	OV159	Ocular Biochemistry	2
OV109	Geometrical Optics – I	4	OV160	Physical Optics	4
OV110	Geometrical Optics – I Lab	2	OV161	Physical Optics Lab	2
OV101	English and communications	4	OV162	Geometrical optics – II	4
OV102	Environmental Studies	4	OV163	Geometrical optics – II Lab	2
OV121/122	Bridge Biology / Basic mathematics	4	OV158	Information Technology	4
OV108	Introduction to optometry	2	OV157	Clinical Optometry-I	2
			OV151	Nutrition	3
	Total	27		Total	27
Third Semester			Fourth Semester		
OV201	Microbiology	2	OV259	Optometric Optics – II & Dispensing Optics	4
OV208	Visual optics – I	2	OV260	Visual Optics – II	2
OV202	Optometric optics- I	3	OV253	Ocular Disease – II	4
OV204	Optometric Instruments	4	OV255	Pathology	3
OV205	Ocular Diseases – I	4	OV254	Pharmacology	3
OV206	Clinical examination of visual system	4	OV261	Introduction to Quality & Patient safety	2
OV209	Indian Medicine and Telemedicine	2	OV262	Medical Psychology	2
OV207	Clinical Optometry-II	3	OV256	Clinical Optometry III	4
	Total	22		Total	21
Fifth Semester			Sixth Semester		
OV310	Contact lens – I	4	OV357	Contact Lens - II	4
OV311	Contact lens – I Lab	2	OV358	Contact lens – II Lab	4
OV303	Low Vision & rehabilitation	2	OV351	Binocular Vision – II	4
OV312	Geriatric Optometry & Pediatric Optometry	4	OV359	Public Health & Community Optometry	3
OV306	Binocular Vision – I	4	OV360	Practice Management	2
OV307	Systemic Disease	2	OV353	Occupational Optometry	4
OV313	Research Methodology & Biostatistics	4	OV361	Medical Law & Ethics	2
OV309	Clinical Optometry IV	4	OV355	Clinical Optometry V	4
	Total	22		Total	25
Seventh Semester			Eight Semester		
OV401	Clinical Internship	20	OV451	Clinical Internship	20
			OV452	Project	4
	Total	20		Total	24
Ninth Semester			Tenth Semester		
OV507	Epidemiology & Community eye care	4	OV553	Ocular Diseases & Diagnostics II	4
OV508	Ocular Diseases & Diagnostics I	4	OV554	Advanced Contact Lens I #	4
OV503	Recent Advances in Optometry	3	OV555	Pediatric Optometry & Binocular Vision	4
OV505	Clinics 1	4	OV556	Low Vision and Geriatric Optometry	4
OV509	Technical Communication	4	OV552	Clinics 2	4
OV510	NEURAL BASIS OF Vision & Visual perception	4	OV557	Research Methodology & Biostatistics	3
OV506	Research Project	4	OV551	Research Project	4
	Total	27		Total	27
Eleventh Semester			Twelfth Semester		
OV601	Advanced Contact Lens II	4	OV651	Clinics 4	4
OV602	Low Vision Care & Rehabilitation	4	OV652	Research Project	8
OV603	Vision Therapy	4			
OV604	Clinics 3	4			
OV605	Research Project	4			
	Total	20		Total	12

Some Basic Information about the course

The student needs to understand and follow the below provided information to be successful in the optometry program.

1. All the students need to maintain an attendance of 75% to be able to attend the end semester examination.
2. During the fourth year where the students go for clinical internship the student has to maintain an attendance of 90% to be able to attend the end semester examination.
3. All the students are supposed to come in formal dress to attend clinical postings. Aprons are must during clinical positing.

GENERAL ANATOMY

INSTRUCTOR IN CHARGE: Anatomist with appropriate qualification.

COURSE DESCRIPTION: General anatomy deals with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

OBJECTIVES: At the end of the semester, the student should be able to:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.
2. Identify the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions.
3. Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyze the integrative and regulative functions on the organs and systems.

TEXT BOOKS:-

1. MARIANO S.H. DIFIIORE: Atlas of Human Histology, 5th Ed. 1981, Lea and Feliger.
2. G.J. TORTORA & N.P ANAGNOSTAKOS: Principles of Anatomy and Physiology. (recent edition)
3. B.D. CHAURASIA: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.

REFERENCE BOOKS:-

1. PETER L. WILLIAMS AND ROGER WARWICK: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.
2. T.S. RANGANATHAN: Text book of Human Anatomy, 1982, S. Chand & Co., New Delhi 110 055.
3. INDERBIR SINGH: Human Embryology, 3rd Ed., Macmillan India, 1981.
4. R. KANAGASUNTHARAM, P. SIVANANDA-SINGHAM & A. KRISHNAMURTI: Anatomy- Regional, Functional, & Clinical, P.G. Publisher, Singapore 1987.

PREREQUISITES: Higher secondary level biology or remedial biology

COURSE PLAN:

Sl. No.	Topics
1	Introduction to Human Anatomy: Anatomy: Definition and its relevance in medicine and optometry Planes of the body, relationship of structures, organ system
2	Skeleton System
3	Tissues of the Body: Epithelium, connective tissue, bone and cartilage, Embryology, histology, different types of each of them, types of cells, cellular differentiation and arrangements in

Sl. No.	Topics
	different tissues
4	Muscles: Different types of muscles, their functional differentiation, their relationship with different structures, their neural supply
5	Blood vessels: Differentiation between arteries and veins, embryology, histology of both arteries and veins, Functional differences between the two, anatomical differences at different locations
6	Skin and appendages: Embryology, anatomical differences in different areas, functional and protective variations, innervations, relationship with muscles and nerves
7	Lymphatic system: Embryology, functions, relationship with blood vessels and organs
8	Glands: Embryology, different types of glands (exocrine and endocrine), functional differences, neural control of glands
9	Nervous system: Parts of Nervous system, cell types of nervous system, Blood-brain barrier, Reflex arc, Peripheral Nerves, Spinal nerves, Nerve fibers, Autonomic Nervous system
10	Brain and Cranial nerves: Major parts of Brain, Protective coverings of the Brain, Cerebrospinal Fluid, Brain stem, Cerebellum, Diencephalon, Cerebrum, Cranial nerves

PRACTICAL: Practical demonstration of each organ using specimen. If specimen for certain organs are not available, then videos can be shown to make the student understand the anatomic structures.

GENERAL PHYSIOLOGY

INSTRUCTOR IN CHARGE: Physiologist with Master's Degree

COURSE DESCRIPTION: General physiology deals with the entire human anatomy with emphasis on different organ systems, their physiological functions with special emphasis on blood and neuro physiology.

OBJECTIVES: 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.

TEXT BOOKS:-

1. L Prakasam reddy, Fundamentals of Medical Physiology, 4th Edition, Paras medical Publisher, Hyderabad, 2008
2. Sujit K. Chaudhuri, Concise Medical Physiology, 6th edition, New Central Book Agency, Kolkata, 2008

REFERENCE BOOKS:-

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. A C Guyton: Text book of Medical Physiology, 8th edition, saunders company, Japan,
3. G J Tortora, B Derrickson: Principles of anatomy & physiology, 11th edition, Harper & Row Publishers, New York
4. John Wiley & Sons Inc, New Jersey, 2007

PREREQUISITES: Higher secondary level biology or remedial biology

COURSE PLAN:

Sl. No.	Topics
1	CELL STRUCTURE & ORGANIZATION Tissue organization Epithelium Connective tissue –Collagen fibers –Elastic fibers –Areolar fibers Cartilage –Bone Contractile tissue –striated –skeletal –cardiac –non striated –plain –myoepithelial General principles of cell physiology Physiology of skeletal muscle
2	BLOOD: Composition Volume measurement & variations Plasma proteins –classification & functions Red blood cells –development, morphology & measurements –functions & dysfunctions. White blood cells –development –classification, morphology –functions &

	<p>dysfunctions</p> <p>Platelets –morphology –development, functions & dysfunctions</p> <p>Clotting –factors –mechanism –anti- coagulants dysfunctions</p> <p>Blood grouping –classification –importance in transfusion, Rh factor & incompatibility</p> <p>Suspension stability</p> <p>Osmotic stability</p> <p>Reticulo endothelial system</p> <ul style="list-style-type: none"> o Spleen o lymphatic tissue o Thymus o bone marrow o immune system o cellular o Humoral o Autoimmune 	
3	<p>DIGESTION:</p> <p>General arrangement</p> <p>Salivary digestion –functions & regulations</p> <p>Gastric digestion –functions & regulations</p> <p>Pancreatic digestion –functions & regulations</p> <p>Intestinal digestion –functions & regulations</p> <p>Liver & bile</p> <p>Absorption</p> <p>Motility</p> <p>Deglutition</p> <p>Vomiting</p> <p>Defecation</p> <p>Functions of large intestine</p> <p>Neurohumoral regulations of alimentary functions, summary</p>	2
4	<p>EXCRETION:</p> <p>Body fluids –distribution, measurement & exchange, Kidney –structure of nephron</p> <p>–mechanism of urine formation –composition of the urine and abnormal constituents –urinary bladder & micturition</p>	
5	<p>ENDOCRINES:</p> <p>Hormone mechanism –negative feed backs –tropic action –permissive action –cellular action, hypothalamic regulation</p> <p>Thyroid - hormones, actions, regulations</p> <p>Adrenal cortex - hormones, actions, regulations</p> <p>Adrenal medulla –hormones, actions, regulations</p> <p>Parathyroid - hormones, actions, regulations</p> <p>Islets of pancreas –hormones, actions, regulations</p> <p>Miscellaneous _ hormones, actions, regulations</p> <p>Common clinical disorders</p>	
6	<p>REPRODUCTION:</p> <p>Male reproductive system –control & regulation</p> <p>Female reproductive system –uterus –ovaries –menstrual cycle –regulation –pregnancy & delivery –breast –family planning</p>	

7	<p>RESPIRATION: Mechanics of respiration –pulmonary function tests –transport of respiratory gases- neural and chemical regulation of respiration –hypoxia, cyanosis, dyspnoea– asphyxia.</p>
8	<p>CIRCULATION: General principles Heart: myocardium –innervation –transmission of cardiac impulse- Events during cardiac cycle –cardiac output. Peripheral circulation: peripheral resistances – arterial blood pressure –measurements –factors regulation variations –capillary circulation – venous circulation. Special circulation: coronary cerebral –miscellaneous</p>
9	<p>ENVIRONMENTAL PHYSIOLOGY Body temperature regulation (including skin Physiology). Exposure to low and high atmospheric pressure</p>
10	<p>NERVOUS SYSTEM: Neuron –Conduction of impulse –synapse –receptor. Sensory organization –pathways and perception Reflexes –cerebral cortex –functions. Thalamus –Basal ganglia Cerebellum. Hypothalamus. Autonomic nervous system –motor control of movements, posture and equilibrium – conditioned reflex, eye hand co-ordination</p>
11	<p>SPECIAL SENSES –(Elementary) Olfaction –Taste –Hearing</p>

PRACTICAL

1. Blood test: Microscope, Haemocytometer, Blood, RBC count, Hb, WBC count, Differential Count, Haematocrit demonstration, ESR, Blood group & Rh. type, Bleeding time and clotting time
2. Digestion: Test salivary digestions
3. Excretion: Examination of Urine, Specific gravity, Albumin, Sugar, Microscopic examination for cells and cysts
4. Endocrinology and Reproduction: Dry experiments in the form of cases showing different endocrine disorders.
5. Respiratory System: Clinical examination of respiratory system, Spirometry, Breath holding test
6. Cardio Vascular System: Clinical examination of circulatory system, Measurement of blood pressure and pulse rate, Effect of exercise on blood pressure and pulse rate
7. Central Nervous System: Sensory system, Motor system, Cranial system, Superficial and deep reflexes

GENERAL BIOCHEMISTRY

INSTRUCTOR IN CHARGE: A post-graduate, a Ph D or MD in biochemistry, with adequate exposure to the profession of optometry and ophthalmology

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.

OBJECTIVES: At the end of the course, the student should be able to: demonstrate his knowledge and understanding on:

1. Structure, function and interrelationship of biomolecules and consequences of deviation from normal.
2. Integration of the various aspects of metabolism, and their regulatory pathways.
3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

TEXT BOOK: S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990
2. D.R. Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

PREREQUISITES: Higher secondary level chemistry with good knowledge of organic chemistry.

COURSE PLAN

Sl.No.	Topics
1	Carbohydrates: Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function)
2	Proteins: Amino acids, peptides, and proteins (general properties & tests with a few examples like glycine, tryptophan, glutathione, albumin, hemoglobin, collagen)
3	Lipids: Fatty acids, saturated and unsaturated, cholesterol and triacylglycerol, phospholipids and plasma membrane
4	Vitamins: General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)
5	Minerals: Na, K, Ca, P, Fe, Cu and Se.(requirements, availability and properties)

PRACTICAL

1. Reactions of monosaccharides, disaccharides and starch:

Glucose	Fructose
Galactose	Maltose, lactose
Sucrose	Starch

2. Analysis of Unknown

Sugars Estimation:

Photometry	Biofluid of choice – blood, plasma, serum
Standard graphs	Glucose
Proteins	Urea
Creatinine	Bilirubin

GEOMETRICAL OPTICS-I Theory

INSTRUCTOR IN CHARGE : A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

1. Tunnaclyffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN

No.	Topics
1.	Nature of light –light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index.
2.	Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance
3.	Refractive index; its dependence on wavelength
4.	Fermat’s and Huygen’s Principle –Derivation of laws of reflection and refraction (Snell’s law) from these principles
5.	Plane mirrors –height of the mirror; rotation of the mirror
6.	Reflection by a spherical mirror –paraxial approximation; sign convention;

	derivation of vergence equation
7.	Imaging by concave mirror, convex mirror
8.	Reflectivity; transmissivity; Snell's Law, Refraction at a plane surface
9.	Glass slab; displacement without deviation; displacement without dispersion
10.	Thick prisms; angle of prism; deviation produced by a prism; refractive index of the Prism
11.	Prisms; angular dispersion; dispersive power; Abbe's number.
12.	Definition of crown and flint glasses; materials of high refractive index
13.	Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; its dependence on refractive index
14.	Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula
15.	Paraxial approximation; derivation of vergence equation
16.	Imaging by a positive powered surface and negative powered surface
17.	Vergence at a distance formula; effectivity of a refracting surface
18.	Definition of a lens as a combination of two surfaces; different types of lens shapes.
19.	Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths
20.	Newton's formula; linear magnification; angular magnification
21.	Nodal Planes
22.	Thin lens as a special case of thick lens; review of sign convention
23.	Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
24.	Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
25.	Prentice's Rule
26.	System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.
27.	System of more than two thin lenses; calculation of equivalent power using magnification formula

GEOMETRICAL OPTICS-I Lab

INSTRUCTOR IN CHARGE : A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

3. Tunnaclyffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
4. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

3. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
4. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN

1. Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index
2. Thin Prism – measurement of deviation; calculation of the prism diopter
3. Image formation by spherical mirrors
4. Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the vergence formula
5. Concave lens – in combination with a convex lens – power determination.

Introductory Optometry

REFERENCE BOOKS: No recommendation. It is left to the faculty.

PREREQUISITES: Nil

COURSE PLAN

1. Basic Principles of Optometry
2. Optometric terminology
3. Vision Screening
4. Introduction to Optometric instruments
5. Overview of the history of the profession
6. Orientation of profession of Optometry (Associations and Groups)
7. Review of the current modalities of clinical practice.

NUTRITION

INSTRUCTOR IN CHARGE: Nutritionist with Masters/ Doctorate

COURSE DESCRIPTION: This course covers the basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and ocular disease, Nutrition and ocular aging, and contraindications, adverse reactions and ocular nutritional supplements.

OBJECTIVES: At the end of the course student would have gained the knowledge of the following: • Balanced diet. • Protein, carbohydrates, vitamins, Minerals, carotenoids and eye. • Nutrition and Ocular aging • Adverse effects of ocular nutritional supplements.

TEXT BOOK:

1. M Swaminathan: Hand book of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore, 2004
2. C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad,2004
3. Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach, Elsevier Butterworth- Heinemann, USA, 2006

REFERENCE BOOKS: No recommendation. It is left to the faculty.

PREREQUISITES: Nil

COURSE PLAN

1. Introduction.
 - 1.1 History of Nutrition
 - 1.2 Nutrition as a science
 - 1.3 Food groups, RDA
 - 1.4 Balanced diet, diet planning.
 - 1.5 Assessment of nutritional status
2. Energy
 - 2.1 Units of energy.
 - 2.2 Measurements of energy and value of food
 - 2.3 Energy expenditure.
 - 2.4 Total energy/calorie requirement for different age groups and diseases.
 - 2.5 Satiety value
 - 2.6 Energy imbalance- obesity, starvation.
 - 2.7 Limitations of the daily food guide.
3. Proteins
 - 3.1 Sources and functions
 - 3.2 Essential and non- essential amino- acids.
 - 3.3 Incomplete and complete proteins
 - 3.4 Supplementary foods.
 - 3.5 PEM and the eye
 - 3.6 Nitrogen balance
 - 3.7 Changes in protein requirement.

4. Fats
 - 4.1 Sources and functions
 - 4.2 Essential fatty acids
 - 4.3 Excess and deficiency
 - 4.4 Lipids and the eye.
 - 4.5 Hyperlipidemia, heart diseases, atherosclerosis.
5. Minerals
 - 5.1 General functions and sources
 - 5.2 Macro and micro minerals associated with the eye.
 - 5.3 Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)
6. Vitamins
 - 6.1 General functions, and food sources
 - 6.2 Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A
 - 6.3 Promoting sound habits in pregnancy, lactation and infancy.
 - 6.4 Nutrient with antioxidant.
 - 6.5 Properties
 - 6.6 Digestion of Proteins, carbohydrates & lipids
7. Essential amino acids.
8. Miscellaneous
 - 8.1 Measles and associated eye disorders, low birth weight

OCULAR ANATOMY

INSTRUCTOR IN CHARGE: Anatomist, Optometrist or Ophthalmologist who have adequate experience in teaching anatomy.

COURSE DESCRIPTION: This course deals with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions.

OBJECTIVES: At the end of the course, the student should be able to:

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.

TEXT BOOK: L A Remington: Clinical Anatomy of the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.

REFERENCE BOOKS: AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006

PREREQUISITES: General anatomy.

COURSE PLAN

1. Embryology of the Eye
2. CNS:
 - Brain Anatomy
 - Cerebrum
 - Cerebellum
 - Mid brain
 - Spinal Cord
 - Cranial Nerves
 - Meninges
3. PNS:
 - Sympathetic
 - Parasympathetic
4. Orbit
 - 2.1 Eye
 - 2.2 Sclera
 - 2.3 Cornea
 - 2.4 Choroid
 - 2.5 Ciliary body
 - 2.6 Iris
 - 2.7 Retina
5. Refractory media-
 - 3.1 Aqueous humor

- 3.2 Anterior chamber
- 3.3 Posterior chamber
- 3.4 Lens
- 3.5 Vitreous body
- 6. Eyelids
- 7. Conjunctiva

- 8. Orbit, EOM and Adnexa
- 9. Lacrimal apparatus
- 10. Vasculature, nerve supply for all the coats, pupil, nerve supply for papillary actions
papillary pathway

PRACTICAL

- 1. Eye: Practical dissection of eye ball

OCULAR PHYSIOLOGY

INSTRUCTOR IN CHARGE: Physiologist, Optometrist or Ophthalmologist with experience in teaching ocular physiology.

COURSE DESCRIPTION: Ocular physiology deals with the physiological functions of each part of the eye.

OBJECTIVES: At the end of the course, the student should be able 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

TEXT BOOK: AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006

REFERENCE BOOKS:

1. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
2. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

PREREQUISITES: General Physiology

COURSE PLAN:

1. Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe
2. Extrinsic eye muscles, their actions and control of their movements
3. Coats of the eye ball
4. Cornea
5. Aqueous humor and vitreous: Intra ocular pressure
6. Iris and pupil
7. Crystalline lens and accommodation – presbyopia
8. Retina – structure and functions
9. Vision – general aspects of sensation
10. Pigments of the eye and photochemistry
11. The visual stimulus, refractive errors
12. Visual acuity, Vernier acuity and principle of measurement
13. Visual perception – Binocular vision, stereoscopic vision, optical illusions
14. Visual pathway, central and cerebral connections
15. Colour vision and colour defects. Theories and diagnostic tests
16. Introduction to electro physiology
17. Scotopic and Photopic vision
18. Color vision, Color mixing
19. Mechanism of accommodation
20. Retinal sensitivity and Visibility
21. Receptive stimulation and flicker
22. Ocular, movements and saccades

22. Visual perception and adaptation
23. Introduction to visual psychology (Psychophysics)

PRACTICAL:

1. Lid movements
2. Tests for lacrimation tests
3. Extra ocular movements
4. Break up time
5. Pupillary reflexes
6. Visual acuity measurement.
7. Light and dark adaptation.

OCULAR BIOCHEMISTRY

INSTRUCTOR IN CHARGE: Masters or Ph D in Biochemistry

COURSE DESCRIPTION: This course is being taught in two consecutive semesters. Ocular Biochemistry deals with the metabolism that takes place in the human body. It also deals with ocular biochemistry in detail. Clinical estimation as well as the clinical significance of biochemical values is also taught.

OBJECTIVES: At the end of the course, the student should be able to demonstrate his knowledge and understanding on

1. Structure, function and interrelationship of biomolecules and consequences of deviation from the normal
2. Integration of various aspects of metabolism and their regulatory pathways
3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data
4. Understand metabolic processes taking place in different ocular structures.

TEXT BOOK: S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

REFERENCE BOOKS:

1. S. Ramakrishnan, K G Prasanna and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990
2. D R Whitehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

PREREQUISITES: Higher secondary level chemistry with good knowledge of organic chemistry and knowledge of Biochemistry I

COURSE PLAN:

1. Hormones basic concepts in metabolic regulation with examples say insulin.
2. Metabolism: General whole body metabolism (carbohydrates, proteins, lipids)
3. Ocular Biochemistry: Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (The important chemicals in each and their roles.)
Immunology of anterior segment
4. Technique: Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry. Radio isotopes: application in medicine and basic research.
5. Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their estimation.

PRACTICAL

1. Quantitative analysis
2. Abnormal constituents in urine, sugar proteins, ketones, blood and bile salts.
3. Techniques of detection of abnormal constituents of urine:
4. Electrophoresis
 - 4.1 Chromatography

- 4.2 Preparation of normal, molar and percentage solutions.
- 4.3 Preparation of buffers, pH determination
- 5. Demonstration
 - 5.1 Estimation of blood cholesterol
 - 5.2 Estimation of alkaline phosphatase.
 - 5.3 Salivary amylase (effect of pH, etc)
 - 5.4 Milk analysis.

PHYSICAL OPTICS Theory

INSTRUCTOR IN CHARGE: A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail.

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

TEXT BOOK: Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

REFERENCE BOOKS:

1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN

No.	Topics
1.	Nature of light –light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase.
2.	Sources of light; Electromagnetic Spectrum.
3.	Polarized light; linearly polarized light; and circularly polarized light.
4.	Intensity of polarized light; Malus’Law; polarizers and analyzers; Methods of producing polarized light; Brewster’s angle.
5.	Birefringence; ordinary and extraordinary rays.
6.	Relationship between amplitude and intensity.
7.	Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
8.	Double slits, multiple slits, gratings.
9.	Diffraction; diffraction by a circular aperture; Airy’s disc
10.	Resolution of an instrument (telescope, for example); Raleigh’s criterion
11.	Scattering; Raleigh’s scattering; Tyndall effect.
12.	Fluorescence and Phosphorescence
13.	Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein’s theory of lasers.
14.	Radiometry; solid angle; radiometric units; photopic and scotopic luminous

	efficiency and efficacy curves; photometric units
15.	Inverse square law of photometry; Lambert's law.
16.	Other units of light measurement; retinal illumination; Trolands

PHYSICAL OPTICS Lab

INSTRUCTOR IN CHARGE: A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail.

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

TEXT BOOK: Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

REFERENCE BOOKS:

1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN

Each practical session could be evaluated for 10 marks and the total could be added to the final evaluations. These practical could be customized as per the university requirements and spaced apart conveniently. The practical to be done include the following:

1. Gratings – determination of grating constant using Sodium vapour lamp; determination of wavelengths of light from Mercury vapour lamp
2. Circular Apertures – measurements of Airy's disc for apertures of various sizes
3. Verification of Malus' Law using a polarizer – analyzer combination
4. Demonstration of birefringence using Calcite crystals
5. Measurement of the resolving power of telescopes.
6. Newton's rings
7. Demonstration of fluorescence and phosphorescence using crystals and paints

GEOMETRICAL OPTICS II: Theory

INSTRUCTOR IN CHARGE : A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

1. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN:

1. Vergence and vergence techniques revised.
2. Gullstrand's schematic eyes, visual acuity, Stile Crawford
3. Emmetropia and ametropia
4. Blur retinal Imaginary
5. Correction of spherical ammetropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic
6. Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.
7. Aperture stops- entrance and exit pupils.
8. Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.
9. Accommodation –Accommodation formulae and calculations.
10. Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.

10. Spatial distribution of optical information- modulation transfer functions- Spatial filtering-applications.
11. Visual optics of aphakia and pseudophakia.

GEOMETRICAL OPTICS II: Lab

INSTRUCTOR IN CHARGE : A post-graduate, preferably a Ph D, in physics, with adequate exposure to the profession of optometry as evidenced by previous teaching experience or publications in optometry journals/magazines OR An optometrist with a post-graduate degree, preferably a Ph D OR An optometrist with an undergraduate degree

COURSE DESCRIPTION: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

TEXT BOOK:

3. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
4. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

3. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
4. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

PREREQUISITES: Higher secondary level mathematics and physics.

COURSE PLAN:

1. Construction of a tabletop telescope – all three types of telescopes.
2. Construction of a tabletop microscope
3. Imaging by a cylindrical lens – relationship between cylinder axis and image orientation
4. Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations
5. Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation

CLINICAL OPTOMETRY I (STUDENTSHIP):

INSTRUCTOR INCHARGE: M Optom/ Ph D with adequate experience in handling clinics and teaching.

Course description

Students will observe the basic operations of the optometry clinic while interacting with the multidisciplinary team members involved in providing optimal care to patients. The student will be introduced to optical terminology, equipment, and techniques used for treatment.

Course Objectives

Students will be introduced to basic optometry clinics. At the end of the semester, students must be able to show competency in basic skills as taking history for different simulated patients, checking visual acuity and lens power.

Text books

1. Theodore Grosvener, primary care optometry, Butterworth – Heinmann
2. William J. Benjamin, Borish's Clinical refraction, Butterworth – Heinmann, 2006

Pre requisites: Introduction to optometry

Course plan

1. Introduction to optometry terms
2. History taking
3. Visual acuity
4. Hand neutralisation
5. Lensometry

OCULAR MICROBIOLOGY

INSTRUCTOR IN CHARGE: Microbiologist with Masters or Ph D qualification.

COURSE DESCRIPTION This course covers the basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

OBJECTIVES The objectives of the course are:

1. To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites;
2. To acquire knowledge of the principles of sterilisation and disinfection in hospital and ophthalmic practice;
3. To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and
4. To understand basic principles of diagnostic ocular Microbiology.

TEXT BOOK:

1. BURTON G.R.W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.
2. M J Pelczar (Jr), ECS Chan, NR Krieg : Microbiology ,fifth edition, TATA McGRAW-HILL Publisher, New Delhi,1993

REFERENCE BOOKS:

1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology
2. SYDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM) 5)

PREREQUISITES: Higher secondary Biology

COURSE PLAN:

1. Morphology and principles of cultivating bacteria
2. Sterilization and disinfections used in laboratory and hospital practice
3. Common bacterial infections of the eye.
4. Common fungal infections of the eye
5. Common viral infections of the eye.
6. Common parasitic infections of the eye.

VISUAL OPTICS I

INSTRUCTOR IN CHARGE: Optometrist with optics teaching experience. Preferably postgraduate or undergraduate with more than 2 years of teaching experience.

COURSE DESCRIPTION: This course deals with the concept of eye as an optical instrument and thereby covers various optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

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

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.

TEXT BOOK:

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

REFERENCE BOOKS:

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
4. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006
5. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth –heinneman, USA, 2002

PREREQUISITES: Geometrical optics, Physical optics, Ocular Physiology

COURSE PLAN

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
2. Optics of Ocular Structure
 - 2.1 Cornea and aqueous
 - 2.2 Crystalline lens
 - 2.3 Vitreous

- 2.4 Schematic and reduced eye
- 3. Measurements of Optical Constants of the Eye
 - 3.1 Corneal curvature and thickness
 - 3.2 Keratometry
 - 3.3 Curvature of the lens and ophthalmophakometry
 - 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 Clinical Optometry
- 4. Refractive anomalies and their causes
 - 4.1 Etiology of refractive anomalies
 - 4.2 Contributing variability and their ranges
 - 4.3 Populating distributions of anomalies.
 - 4.4 Optical component measurements
 - 4.5 Growth of the eye in relation to refractive errors

OPTOMETRIC OPTICS I

INSTRUCTOR IN CHARGE: Optometrist - B optom / M Optom/ Ph D / FBDO

COURSE DESCRIPTION: This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect.

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

1. Measurement of lens power , lens centration using conventional techniques
2. Transposition of various types of lenses •Knowledge to identify different forms of lenses (equi- convex, planoconvex, periscopic, etc.)
3. Knowledge to select the tool power for grinding process.
4. Measurement of surface powers using lens measure.
5. Method of laying off the lens for glazing process.
6. Ophthalmic prism knowledge –effects, units, base-apex notation, compounding and resolving prisms.
7. Knowledge of prism and decentration in ophthalmic lenses
7. Knowledge of different types of materials used to make lenses and its characteristics
8. Knowledge lens designs –single vision, bifocals, progressive lens
9. Knowledge on tinted and protective lenses
10. Knowledge on special lenses like iseikonic, spectacle magnifiers.
11. Knowledge on spectacle frames –manufacture, materials

TEXT BOOK: Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.

REFERENCE BOOKS:

1. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999
2. C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996

PREREQUISITES: Physical Optics, Geometrical Optics

COURSE PLAN

1. Introduction –Light, Mirror, Reflection, Refraction and Absorption
2. Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel’s prisms, rotary prisms
3. Lenses –Definition, units, terminology used to describe, form of lenses
4. Vertex distance and vertex power, Effectivity calculations
5. Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical
6. Transpositions –Simple, Toric and Spherical equivalent
7. Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinderlenses
8. Spherometer & Sag formula, Edge thickness calculations
9. Magnification in high plus lenses, Minification in high minus lenses

10. Tilt induced power in spectacles
11. Aberration in Ophthalmic Lenses

OPTOMETRIC INSTRUMENTS

INSTRUCTOR IN CHARGE: Optometrist with experience in teaching instrument course (B Optom/M Optom/ Ph D) or Bioengineer with experience in teaching

COURSE DESCRIPTION: This course covers commonly used optometric instruments, its basic principle, description and usage in clinical practice.

OBJECTIVES: Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments

1. Visual Acuity chart/drum
2. Retinoscope
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Biomicroscope
7. Slit lamp Ophthalmoscopy (+90, 78 D)
8. Gonioscope
9. Tonometer: Applanation Tonometer
10. Keratometer
11. Perimeter
12. Electrodiagnostic instrument (ERG, VEP, EOG)
13. A –Scan Ultrasound
14. Lensometer

TEXT BOOK: David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

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

PREREQUISITES: Geometrical optics

COURSE PLAN

1. Refractive instruments
 - 1.1 Optotypes and MTF, Spatial Frequency
 - 1.2 Test charts standards.
 - 1.3 Choice of test charts
 - 1.4 Trial case lenses
 - 1.5 Refractor (phoropter) head units
 - 1.6 Optical considerations of refractor units
 - 1.7 Trial frame design
 - 1.8 Near vision difficulties with units and trial frames
 - 1.9 Retinoscope – types available

- 1.10 Adjustment of Retinoscopes- special features
- 1.11 Objective optometers.
- 1.12 Infrared optometer devices.
- 1.13 Projection charts
- 1.14 Illumination of the consulting room.
- 1.15 Brightness acuity test
- 1.16 Vision analyzer
- 1.17 Pupilometer
- 1.18 Potential Acuity Meter
- 1.19 Abberometer
2. Ophthalmoscopes and related devices
 - 2.1 Design of ophthalmoscopes – illumination
 - 2.2 Design of ophthalmoscopes- viewing
 - 2.3 Ophthalmoscope disc
 - 2.4 Filters for ophthalmoscopy
 - 2.5 Indirect ophthalmoscope
3. Lensometer, Lens gauges or clock
4. Slit lamp
5. Tonometers
6. Keratometer and corneal topography
7. Refractometer
8. Orthoptic Instruments (Synaptophore Only)
9. Color Vision Testing Devices
10. Fields of Vision And Screening Devices
11. Scans
12. ERG
13. New Instruments

OCULAR DISEASES I

INSTRUCTOR IN CHARGE: Ophthalmologist or Optometrist with teaching experience
(B Optom/ M Optom/ Ph D)

COURSE DESCRIPTION: This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases:

1. Etiology
2. Epidemiology
3. Symptoms
4. Signs
5. Course sequelae of ocular disease
6. Diagnostic approach and
7. Management of the ocular diseases.

TEXT BOOK: A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

REFERENCE BOOKS:

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

PREREQUISITES: Ocular anatomy and Ocular Physiology, Ocular Biochemistry and Microbiology, Pharmacology

COURSE PLAN

Ocular Adnexa

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Palpation of relevant structures
- Lid eversion
- Diagnosis and management of marginal lid disease
- Tonus and strength testing of facial and lid muscles by the third and seventh cranial nerves
- Tests for integrity of the fifth cranial nerve
- Sinus evaluation (history, discharge, fever, etc.)
- Biomicroscopic appearance of relevant structures in health and disease
- External photography and documentation
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Lacrimal System

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Palpation of sac, canaliculi, and lacrimal fossa; observation of lid dynamics, punctal position
- Biomicroscopic appearance
- Use of fluorescein, rose Bengal and Lissamine green dyes
- Tests of basic and reflex secretion
- Fluorescein transit tests to nose and oropharynx
- Saccharin taste test
- Signs and symptoms of related systemic diseases
- Qualitative & quantitative tear assessment
- Punctal dilation; probing and lacrimal syringing
- Collagen punctum plugs
- Punctum/canalicular occlusion

Pathophysiology, diagnosis, management options, and prognosis

Conjunctiva

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy to highlight and describe morpholog and location of ireegularities, deposits, opacities, etc.
- Evaluation of preauricular and submandibular lymph nodes
- History and evaluation of oropharynx for associated upper respiratory illness
- History related to associated urniary tract infection
- Biomicroscopic appreance of varied appearance of the lids and cornea in primay conjunctival disease
- Swabbing, scraping; smears, stains and cultures
- Signs and symptoms o related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Differential diagnosis of viral, bacterial and allergic conjunctivitis

- Treatment of conjunctivits

Evaluation of regional lymph nodes

Cornea

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy to highlight and describe morpholog and location of ireegularities, deposits, opacities, etc.

- Evaluation of surface optical quality and abnormal curvature via reflections
- Corneal aesthesiometry and pachometry
- Use of anesthetics/vital dyes
- Obtaining and interpreting smears and cultures
- Slit-lamp photography
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Sclera / Episclera

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Investigation of entities producing pain in or referred to eye and orbit
- Biomicroscopic techniques useful to detect episcleral and scleral inflammation deep to conjunctival injection/chemosis
- Indirect ophthalmoscopy to detect posterior scleritis
- Signs and symptoms of related systemic diseases
- Use of topical vasoconstrictor

Pathophysiology, diagnosis, management options, and prognosis

Anterior Uvea (Iris and Ciliary Body)

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Biomicroscopy
- Gonioscopy
- Transillumination in albinoids
- Evaluation of pupil
- Binocular indirect ophthalmoscopy, with scleral depression
- Referral criteria for special tests
- Slit-lamp photography
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Pupillary, Accommodative and Refractive Pathology

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Evaluation of the sympathetic pathway
- Evaluation of the parasympathetic pathway and surrounds in third nerve disease
- Relevant pharmacology: including diagnostic tests in Adie's and Horner's syndromes; testing for a pharmacologically blocked pupil as well as the

- effects of autonomically active drugs and toxicology o accommodative paresis, spasm and ciliary body oedema
- Swinging flashlight and pupil cycle tests
- Evaluation and recognition of signs of aberrant regeneration
- Evaluation of deep tendon reflexes in Adie's syndrome
- Evaluation of suspicious refractive shifts
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Orbit

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Assessment of asymmetrical fissures
- Recognition of dysplasia craniofacial appearance
- General workup for periorbital ache/pain of unknown cause
- Exophthalmometry
- Palpation of orbital rim and anterior orbit
- Evaluation of episcleral venous dilation
- Assessment of periorbital oedema
- Testing for orbital bruits
- Valsalva maneuver in proptosis
- Workup for suspected blow out fracture
- Tests for restrictive myopathy
- Special tests including tomograms, ultrasound, GT-scan, venograms
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Anterior Chamber, Angle Structure and Abnormal IOP

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Tensions
- Biomicroscopic appearance of associated anterior segment signs of glaucomas
- Tests for estimation of chamber depth
- Gonioscopy, direct and indirect
- Estimating ocular rigidity with Shiotz tonometer
- Assessment of post surgical eyes
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Lens / Aphakia / Pseudophakia

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Lens toxicology
- Biomicroscopy
- Ophthalmoscopy
- Retinal integrity testing with opaque media
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

CLINICAL EXAMINATION OF THE VISUAL SYSTEM

INSTRUCTOR IN CHARGE: B Optom or higher optometry degree or Ophthalmologist can teach this course

COURSE DESCRIPTION: This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuroophthalmic examination, paediatric optometry examination, and Glaucoma evaluation.

OBJECTIVES: At the end of the course the students will be skilled in knowing the purpose, set-up and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures

TEXT BOOK: T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heineman, USA, 2007.

REFERENCE BOOKS:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007
2. D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth-Heinemann, 2007
4. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991
5. N B. Carlson , DI Kurtz: Clinical Procedures for Ocular Examination ,3rd edition, McGraw-Hill Medical, 2003

PREREQUISITES: Optometric Instruments, Pharmacology

COURSE PLAN

1. History taking
2. Visual acuity estimation
3. Extraocular motility, Cover test, Alternating cover test
4. Hirschberg test, Modified Krimsky
5. Pupils Examination
6. Maddox Rod
7. Van Herrick
8. External examination of the eye, Lid Eversion
9. Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),
10. Color Vision
11. Stereopsis
12. Confrontation test
13. Photostress test
14. Slit lamp biomicroscopy
15. Ophthalmoscopy
16. Tonometry

17. ROPLAS
18. Amsler test
19. Contrast sensitivity function test
20. Saccades and pursuit test

INDIAN MEDICINE AND TELEMEDICINE

INSTRUCTOR IN CHARGE: Public health professional or optometrist who have knowledge in National health care system.

COURSE DESCRIPTION: This course insight into existing healthcare system in India.

OBJECTIVES: At the end of the course student will be aware of the traditional and the latest healthcare system. The student also will get basic knowledge about the telemedicine practices in India especially in eye care.

TEXT BOOK: Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014 (page 167 -178)

REFERENCE BOOKS: Faculty may decide.

COURSE PLAN:

Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
 - 1.1 Healthcare delivery system in India at primary, secondary and tertiary care
 - 1.2 Community participation in healthcare delivery system
 - 1.3 Health system in developed countries.
 - 1.4 Private Sector
 - 1.5 National Health Mission
 - 1.6 National Health Policy
 - 1.7 Issues in Health Care Delivery System in India
2. National Health Programme-Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.
3. Introduction to AYUSH system of medicine
 - 3.1 Introduction to Ayurveda.
 - 3.2 Yoga and Naturopathy
 - 3.3 Unani
 - 3.4 Siddha
 - 3.5 Homeopathy
 - 3.6 Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics-
 - 5.1 Demography – its concept
 - 5.2 Vital events of life & its impact on demography
 - 5.3 Significance and recording of vital statistics
 - 5.4 Census & its impact on health policy
6. Epidemiology
 - 6.1 Principles of Epidemiology
 - 6.2 Natural History of disease
 - 6.3 Methods of Epidemiological studies
 - 6.4 Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

CLINICAL OPTOMETRY II (STUDENTSHIP)

INSTRUCTOR INCHARGE: M Optom/ Ph D with adequate experience in handling clinics and teaching.

Course description

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a registered optometrist. Students are tested on intermediate clinical optometry skills. The practical aspects of the dispensing optics(hand-on in optical), optometric instruments, clinical examination of visual system(Hands-on under supervision) and ocular diseases (Slides and case discussion) will be given to the students during their clinical training.

Course Objectives

At the end of the semester, students must be able to show competency in objective refraction, torch light evaluation of eye and adnexa perform the techniques mentioned in course plan.

Text books

1. David B Elliot, Clinical procedures in optometry, Butterworth – Heinmann, 2003
2. Retinoscopy book, An introductory manual for eye care professionals. John M. Corboy. Slack Incorporated publishers

Reference books

1. Theodore Grosvener, primary care optometry, Butterworth – Heinmann publishers.
2. William J. Benjamin, Borish's Clinical refraction, Butterworth – Heinmann , 2006.

Pre requisites: Introduction to optometry, Clinical optometry 1, ocular anatomy, ocular physiology.

Course plan

1. Objective refraction – retinoscopy, keratometry
2. Near point of convergence
3. Near point of accommodation
4. Torch light examination
5. Pupillary evaluation
6. Extra ocular motility testing

OPTOMETRIC OPTICS II & Dispensing Optics

OPTOMETRIC OPTICS II

INSTRUCTOR INCHARGE: Optometrist (M.Optom/Ph D). Practicing Optometrists with experience in Optical Dispensing & Optical Laboratory In-charge

COURSE DESCRIPTION: This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. In addition deals with role of optometrists in optical set-up.

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

1. To select the tool power for grinding process
2. Different types of materials used to make lenses and its characteristics
3. Lens designs–Bifocals, progressive lens
4. Tinted, Protective & Special lenses
5. Spectacle frames –manufacture process & materials
6. Art and science of dispensing spectacle lens and frames based on the glass prescription.
7. Reading of spectacle prescription. Counselling the patient
8. Lens edge thickness calculation
9. Frame & lens measurements and selection
10. Writing spectacle lens order
11. Facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)
12. Lens verification and axis marking and fitting of all lens types
13. Final checking of finished spectacle with frame adjustments
14. Delivery and follow-up
15. Troubleshooting complaints and handling patient's questions

TEXT BOOK/REFERENCE BOOKS:

1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996
3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth - Heinemann, 2007
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

PREREQUISITES: Geometrical Optics, Physical Optics & Ocular Physiology, Optometric Optics - I

COURSE PLAN

Sl. No	Topics
1.	Spectacle Lenses - II: <ul style="list-style-type: none"> <input type="checkbox"/> Manufacture of glass <input type="checkbox"/> Lens materials <input type="checkbox"/> Lens surfacing <input type="checkbox"/> Principle of surface generation and glass cements <input type="checkbox"/> Terminology used in Lens workshop <input type="checkbox"/> Lens properties <input type="checkbox"/> Lens quality <input type="checkbox"/> Faults in lens material <input type="checkbox"/> Faults on lens surface
	<ul style="list-style-type: none"> <input type="checkbox"/> Methods of Inspecting the quality of lenses <input type="checkbox"/> Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)
2.	Spectacle Frames: <ul style="list-style-type: none"> <input type="checkbox"/> Types and parts <input type="checkbox"/> Classification of spectacle frames-material, weight, temple position, Coloration <input type="checkbox"/> Frame construction <input type="checkbox"/> Frame selection <input type="checkbox"/> Size, shape, mounting and field of view of ophthalmic lenses
3.	Tinted & Protective Lenses <ul style="list-style-type: none"> <input type="checkbox"/> Characteristics of tinted lenses Absorptive Glasses <input type="checkbox"/> Polarizing Filters, Photochromic & Reflecting filters <input type="checkbox"/> Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses
4.	Multifocal Lenses: <ul style="list-style-type: none"> <input type="checkbox"/> Introduction, history and development, types <input type="checkbox"/> Bifocal lenses, Trifocal & Progressive addition lenses
5.	Reflection from spectacle lens surface & lens coatings: <ul style="list-style-type: none"> <input type="checkbox"/> Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line <input type="checkbox"/> Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating
6.	Miscellaneous Spectacle: <ul style="list-style-type: none"> <input type="checkbox"/> Iseikonic lenses <input type="checkbox"/> Spectacle magnifiers <input type="checkbox"/> Recumbent prisms <input type="checkbox"/> Fresnel prism and lenses <input type="checkbox"/> Lenticular & Aspherical lenses <input type="checkbox"/> High Refractive index glasses

DISPENSING OPTICS:

Sl. No.	Topic
1	Components of spectacle prescription & interpretation, transposition, Add and near power relation
2	Frame selection –based on spectacle prescription, professional requirements, age group, face shape
3	Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height
4	Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt
5	Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)
6	Neutralization –Hand & lensometer, axis marking, prism marking
7	Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)
8	Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit
9	Spectacle repairs –tools, methods, soldering, riveting, frame adjustments
10	Special types of spectacle frames <ul style="list-style-type: none">➤ Monocles➤ Ptosis crutches➤ Industrial safety glasses➤ Welding glasses
12	Frame availability in Indian market
13	FAQ's by customers and their ideal answers

VISUAL OPTICS II:

INSTRUCTOR INCHARGE: Optometrist (M.Optom/Ph D)

COURSE DESCRIPTION: This course deals with the concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

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

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.

TEXT BOOK/REFERENCE BOOKS:

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
2. Duke –Elder’s practice of Refraction
3. AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006
4. George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002
5. Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth – Heinemann, 2002
6. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann, 2007
7. WJ Benjamin: Borish’s clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

PREREQUISITES: Geometrical Optics, Physical Optics & Ocular Physiology, Visual optics -I **COURSE PLAN**

Sl. No	Topics
1.	Accommodation & Presbyopia <ul style="list-style-type: none"><input type="checkbox"/> Far and near point of accommodation<input type="checkbox"/> Range and amplitude of accommodation<input type="checkbox"/> Mechanism of accommodation<input type="checkbox"/> Variation of accommodation with age
	<ul style="list-style-type: none"><input type="checkbox"/> Anomalies of accommodation<input type="checkbox"/> Presbyopia<input type="checkbox"/> Hypermetropia and accommodation
2.	Convergence: <ul style="list-style-type: none"><input type="checkbox"/> Type, Measurement and Anomalies<input type="checkbox"/> Relationship between accommodation and convergence-AC/A ratio
3.	Objective Refraction (Static & Dynamic) <ul style="list-style-type: none"><input type="checkbox"/> Streak retinoscopy<input type="checkbox"/> Principle, Procedure, Difficulties and interpretation of findings<input type="checkbox"/> Transposition and spherical equivalent

	<ul style="list-style-type: none"> <input type="checkbox"/> Dynamic retinoscopy various methods <input type="checkbox"/> Radical retinoscopy and near retinoscopy <input type="checkbox"/> Cycloplegic refraction
4.	<p>Subjective Refraction:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Principle and fogging <input type="checkbox"/> Fixed astigmatic dial(Clock dial),Combination of fixed and rotator dial(Fan and block test),J.C.C <input type="checkbox"/> Duochrome test <ul style="list-style-type: none"> o Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging o Binocular refraction-Variou techniques
5.	<p>Effective Power &Magnification :</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ocular refraction vs. Spectacle refraction <input type="checkbox"/> Spectacle magnification vs. Relative spectacle magnification <input type="checkbox"/> Axial vs. Refractive ammetropia, Knapp's law <input type="checkbox"/> Ocular accommodation vs. Spectacle accommodation <input type="checkbox"/> Retinal image blur-Depth of focus and depth of field

OCULAR DISEASE II :

INSTRUCTOR INCHARGE: Ophthalmologist

CO-INSTRUCTORS: Optometrist (Minimum UG in Optometry)

COURSE DESCRIPTION: This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: knowledge on

1. Etiology
2. Epidemiology
3. Symptoms
4. Signs
5. Course sequel of ocular disease
6. Diagnostic approach, and
7. Management of the ocular diseases.

TEXT BOOK: A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

REFERENCE BOOKS:

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007

PREREQUISITES: Ocular anatomy and Ocular Physiology, Ocular Biochemistry and Microbiology, Ocular Disease - I

COURSE PLAN

Posterior Pole

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Direct ophthalmoscopy
- Indirect ophthalmoscopy
- Family history
- Biomicroscopy with fundus lenses
- Ophthalmodynamometry
- Colour vision testing
- Photo stress testing
- Amsler Grid testing
- Visual fields

- Dark adaptometry
- Contrast sensitivity testing
- Retinal photography
- Basic interpretation of special studies (EOG, ERG, VER, intravenous fluorescein angiography, ultrasound)
- Retinal integrity testing with opaque media
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Methods to assess retinal function in presence of corneal irregularity and media opacities

Peripheral Fundus / Vitreous

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Binocular indirect ophthalmoscopy, scleral depression and retinal drawing
- Biomicroscopy with peripheral fundus lenses
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Optic Nerve Pathology

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Nerve toxicology
- Colour vision testing in optic nerve disorders
- Visual field testing
- Testing for objective and subjective afferent papillary defects
- Pupil cycle times
- Pulfrich phenomenon
- Use of neutral density filters
- Interpretation of electrodiagnostic tests, contrast sensitivity, etc.
- Observation of nerve head and peripapillary retina with ophthalmoscope, fundus lenses and stereophotography
- Carotid assessment
- Plain x-rays, tomograms, CT-scans ultrasound and intravenous fluorescein
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Sensory Neuro-Visual Pathology

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Transient neuro-visual episodes
- Detailed visual fields
- Detailed headache workup
- Indications, limitations, risks and costs of intravenous angiography, direct puncture angiography, plain x-rays, tomograms, CT-scan, air studies EEG, radio-nucleotide scanning, nuclear magnetic resonance scan
- Signs and symptoms of related systemic diseases

Pathophysiology, diagnosis, management options, and prognosis

Oculomotor Neuropathology

Epidemiology, history and symptom inventory

Observation, inspection, recognition of signs, and techniques and skills including:

- Objective and subjective testing for incomitancy
- Strength and fatigue testing in myopathies
- Recognition and examination for orbital signs
- Understanding indications for intravenous tension
- Signs and symptoms of related systemic diseases and observation, inspection, recognition of signs, and techniques and skills appropriate to supranuclear oculomotor neuropathology including:
 - Observation, inspection and testing stability of eyes in fixation
 - Testing for adequacy of pursuits
 - Testing for adequacy of saccades
 - Testing for extraocular muscle reflexes
 - Assessment of "dizzy" patient

Pathophysiology, diagnosis, management options, and prognosis

PATHOLOGY

COURSE DESCRIPTION: This course describes basic aspects of disease processes with reference to specific entities relevant in optometry/ophthalmology.

OBJECTIVES At the end of the course students will acquire knowledge in the following aspects:

1. Inflammation and repair aspects.
2. Pathology of various eye parts and adnexa.

TEXT BOOK K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

REFERENCE BOOKS:

1. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.
2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

PREREQUISITES: Higher Secondary Biology, General and Ocular Anatomy, General and Ocular Physiology

COURSE PLAN

General:

1. Cell Injury and Adaptation
2. Inflammation and Repair
 - Types of Inflammation
 - Repair and Wound Healing
3. Circulatory disturbances:
 - Hemostasis
 - Thrombosis
 - Infarction
 - Edema
 - Shock
4. Neoplasia
5. Infections
 - General
 - Specific: Tuberculosis, Leprosy, Syphilis, Fungal infection, Viral chlamydial infection
6. Genetic Basis of disease
7. Hematology:
 - Anemia
 - Leukemia
 - Bleeding disorders
8. Clinical pathology- Urine examination & blood smears
9. Clinical Pathology- Visit to Health centre laboratory for observation

Ocular Pathology:

- Cornea & conjunctiva
 - Congenital Conditions
 - Corneal Infections
 - Corneal Degenerations
 - Corneal Dystrophies
 - Tumors

- Lens
 - Cataract
- Uvea
 - Uveitis
 - Uveal Tumors
- Retina
 - Retinoblastoma
 - Retinal Changes in Various diseases
- Optic nerve
 - Inflammation
 - Tumors
- Eyelids and orbit
 - Congenital lesions
 - Cysts
 - Inflammations
 - Tumors
- Pathology of Glaucoma
- Visit to lab to see the histopathology slides for demonstration

BASIC AND OCULAR PHARMACOLOGY

INSTRUCTOR INCHARGE: Pharmacologist/Ophthalmologist

COURSE DESCRIPTION: This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.

OBJECTIVES: At the end of the course the students will acquire knowledge in the following aspects-

1. Basic principle of pharmacokinetics & Pharmacodynamics
2. Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

TEXT BOOK/REFERENCE BOOKS:

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
3. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

PREREQUISITES: General Physiology & Biochemistry

COURSE PLAN

Sl. No	Topics
1.	General Pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factors modifying drug actions
2.	Systemic Pharmacology: Autonomic nervous system: Drugs affecting pupillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Anti-hypertensive sand drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, General & local anesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants
3.	Ocular Pharmacology: Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology
4.	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedures, Anti-glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial; Drugs used in allergic, inflammatory& degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants

MEDICAL PSYCHOLOGY

INSTRUCTOR INCHARGE: Clinical Psychologist (Post Graduate/M.Phil/ PhD)

COURSE DESCRIPTION: This course covers various aspects of medical psychology essential for the optometrist.

OBJECTIVES: At the end of the course, the student would have gathered knowledge various aspects of medical psychology essential for him to apply in the clinical scenario during his clinical postings.

TEXT BOOK: Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013

REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: Basic clinical knowledge.

COURSE PLAN

1. Introduction to Psychology
2. Intelligence Learning, Memory, Personality, Motivation
3. Body Integrity – one's body image
4. The patient in his Milieu
5. The self-concept of the therapist, Therapist-patient relationship – some guidelines
6. Illness, its impact on the patient
7. Maladies of the age and their impact on the patient's own and others concept of his body image
8. Adapting changes in Vision
9. Why Medical Psychology demands commitment?

INTRODUCTION TO QUALITY AND PATIENT SAFETY

INSTRUCTOR INCHARGE: Qualified personnel to handle the subject, preferably who have experience in handling such scenarios practically or at least experience in teaching.

COURSE DESCRIPTION: This course deals with various aspects of quality and safety issues in health care services.

OBJECTIVES: At the end of the course, students have gained introductory knowledge about quality and patient safety aspects from Indian perspectives.

COURSE PLAN:

1. Quality assurance and management
2. Basics of emergency care and life support skills
3. Biomedical waste management and environment safety
4. Infection and prevention control
5. Antibiotic resistance
6. Disaster preparedness and management

CLINICAL OPTOMETRY III (STUDENTSHIP)

INSTRUCTOR INCHARGE: M Optom/ Ph D with adequate experience in handling clinics and teaching.

Course description

Students will improve their skills in clinical procedures, and then progressive interactions with patients and professional personal are monitored as students practice optometry in supervised setting. Additional area includes problem solving and complications of various managements will be inculcated. Students should have exposure to eye bank facilities and must be made aware of eye donation, collection of eyes, preservation, pre and post-operative instructions and latest techniques for preservation of donor cornea. The students will get clinical training on the practical aspects of the following courses namely optometric optic –II & dispensing optics, visual optics – II and ocular disease -II.

Course Objectives

At the end of the semester, students are expected to learn subjective refraction, accommodative and phoria assessment. The students must be able to perform objective and subjective refraction with good accuracy.

Text books

1. David B Elliot, Clinical procedures in optometry, Butterworth – Heinmann, 2003

Reference books

1. Theodore Grosvener, primary care optometry, Butterworth – Heinmann
2. William J. Benjamin, Borish's Clinical refraction, Butterworth – Heinmann, 2006

Pre requisites: Visual optics, Optometric instruments, Clinical examination of visual system, Optometric optics.

Course plan

1. Refining of objective refraction
 1. Cycloplegic technique
2. Dynamic retinoscopy
3. Subjective refraction
 - a. Jackson cross cylinder
 - b. Overfogging procedures
 - c. Binocular balancing techniquesRelative accommodation
Stereopsis, colour vision tests
Phoria testing
Tear film evaluation

CONTACT LENSES I Theory

INSTRUCTOR INCHARGE: B.Optom or optometrists with higher qualification.

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

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

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN

1. Introduction to Contact lenses
2. Contact lens terminology and classification 2.1. Parameters, and designs
3. History of contact lenses 3.1. Describe the work of early contact lens experimenters in the 19th century 3.2. Describe the development of different contact lenses fittings by preformed and various methods in the early 20 th century
4. Optics of contact lenses 4.1. Magnification & Visual field 4.2. Accommodation & Convergence 4.3. Back & Front Vertex Power / Vertex distance calculation
5. Review of Anatomy & Physiology of anterior ocular surface and its interaction with contact lenses 5.1. Tear film 5.2. Eye lids & Conjunctiva 5.3. Cornea
6. Introduction to CL materials 6.1. Describe the main types of polymers from which contact lens are made of 6.2. Discuss the properties of thermoplastics, RGP co-polymers, synthetic elastomers and

<p>hydrogels</p> <p>6.3. Describe the following properties of the contact lens material:</p> <ul style="list-style-type: none"> (a) density (b) refractive index & optical transmittance (c) dimensional stability e.g. to temperature, pH (d) wettability (e) Dk, Ionicity and water content (f) Elasticity, tensile strength and rigidity (g) deposit resistance
7. Indications and contraindications
<p>8. Contact Lens Manufacture</p> <ul style="list-style-type: none"> 8.1. Understand the ways contact lenses are manufactured 8.2. Describe the manufacturing procedures for hard and RGP lenses 8.3. Describe the following manufacturing processes for soft lenses: <ul style="list-style-type: none"> (a) spin-cast (b) lathe-cut (c) cast-moulding (d) stabilized soft moulding (e) Combination techniques
<p>9. Contact Lens Verifications and Modifications</p> <ul style="list-style-type: none"> 9.1. Understand the verification of contact lens and the possible modifications 9.2. List the parameters that may need verifying for contact lens 9.3. Describe the various equipment that are necessary for verifications 9.4. Describe the various procedures for contact lens verifications of: <ul style="list-style-type: none"> (a) radius of curvature (b) diameter (c) thickness (d) power (e) surface quality (f) tint (g) List some of the common types of modification for contact lens
<p>10. Contact lens insertion & removal –</p> <ul style="list-style-type: none"> 10.1. Handling techniques of SCL, RGP, and Specialty 10.2. Dos and Don'ts
11. Modifications possible with Rigid lenses
<p>12. Introduction to Contact Lens Care & Maintenance: Understand the basic microbiology & antimicrobial agents that are related to the CL care & maintenance</p> <ul style="list-style-type: none"> 12.1. Discuss briefly the basic microbiology of prokaryotes and eukaryotes 12.2. Describe the microbiology of the eye that are of concern to contact lens wear 12.3. List the common physical and chemical antimicrobial agents in general 12.4. Differentiate the terms: sterilization, disinfection and preservation 12.5. Describe the modes of action of the chemical & physical agents of antimicrobial agents
<p>13. Preservatives in Contact Lens Solutions: Understand the role of preservatives in contact lens solutions and their properties</p> <ul style="list-style-type: none"> 18.1. List the preservatives that are found in contact lens solutions 18.2. Describe the modes of action of preservatives 18.3. Discuss the action of preservatives with the possible contaminations to CL solutions 18.4. Explain the limitations of preservatives acting as disinfection agents 18.5. Discuss the advantages of preservatives 18.6. Discuss the disadvantages of preservatives
<p>14. Contact Lens Cleaners: Understand the importance of the use of daily and periodic cleaners to contact lens wear</p>

<p>19.1. Explain the importance of cleaners in contact lens wear</p> <p>19.2. Discuss the differences between the daily and periodic cleaners</p> <p>19.3. Describe the actions and effects of the different daily cleaners e.g. Subtilisin, papain</p> <p>19.4. Describe the actions and effects of the different periodic cleaners e.g. protein cleaners and sodium perborate</p>
<p>15. Rinsing Solutions and Lubricants: Understand the role of the rinsing solutions and lubricants</p> <p>15.1. Discuss the various forms of the rinsing solution found in the market place</p> <p>15.2. Describe the functions of the rinsing solution</p> <p>15.3. Discuss the advantages and disadvantages of using preserved and non-preserved rinsing solution</p> <p>15.4. Describe the functions of the wetting and rewetting agents</p> <p>15.5. Discuss the principles of the wetting process</p> <p>15.6. Describe the importance of tonicity and buffering in contact lens solution</p> <p>15.7. Describe the actions of the wetting agents</p> <p>15.8. Describe the actions of the rewetting agents</p>
<p>16. Contact Lens Disinfection: Understand the various methods of contact lens disinfection</p> <p>16.1. Discuss the importance of contact lens disinfection</p> <p>16.2. Describe the actions and effects of the heat and chemical disinfection systems</p> <p>16.3. Compare and contrast the advantages and disadvantages of the heat and chemical disinfection systems</p> <p>16.4. Discuss the popular chemicals used in the contact lens disinfection solutions</p> <p>16.5. Compare and contrast the various chemical disinfection systems</p>
<p>17. Ocular Complications Due to Care System: Understand some of the common complications that can arise from the care system</p> <p>17.1. List some of the circumstances where ocular health can be compromised with the care system</p> <p>17.2. State some possible complications related to the care system</p> <p>17.3. Compare toxicity and sensitivity</p> <p>17.4. Describe the underlying causes for eye complications related to the care system</p>
<p>18. Contact lens follow up visit examination</p>
<p>19. Complications of contact lenses (SCL)</p>

CONTACT LENSES I Lab

INSTRUCTOR QUALIFICATION: M.Optom or optometrists with higher qualification, with contact lens specialization..

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

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

- 1 Understand the basic properties of contact lenses
- 2 Able to verify various types of contact lenses and their parameters
- 3 Learn the concepts and practical aspects of CL care & maintenance
- 4 Able to insert and remove various types of contact lenses

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE OUTLINE

1. Properties of contact lens materials 1.1. PMMA 1.2. RGP CL 1.3. Hydrogels / Silicone Hydrogels
2. Verification of hard & RGP contact lenses 2.1. Back Optic Zone Diameter 2.2. Central Thickness 2.3. Back Vertex Power 2.4. Lens Diameter 2.5. Optic Zone Diameter 2.6. PCW/PCR 2.7. Surface Quality & Edge design 2.8. Tint
3. Verification of hydrogel contact lenses 3.1. BOZR 3.2. Lens Diameter 3.3. Lens Central Thickness 3.4. Lens Surface Quality 3.5. Back Vertex Power 3.6. Water Content 3.7. Tint
4. Contact lens cleaning & Disinfection procedures 4.1. Cleaners 4.2. Saline 4.3. Disinfecting solutions

4.4. Hydrogen Peroxide solutions
4.5. Enzymatic Tablets
4.6. Lens Storage Case
4.7. Silt-lamp with live demo (camera & monitor)
5. Insertion & removal of contact lenses
5.1. RGP CLs
5.2. Hydrogel lenses

LOW VISION CARE

INSTRUCTOR INCHARGE: Optometrist with Low vision clinical experience

COURSE DESCRIPTION: This course deal with the definition of low vision, epidemiology aspect of visual impairment, types of low vision devices and its optical principles, clinical approach of the low vision patients, assistive devices for totally visually challenged, art of prescribing low vision devices and training the low vision patients and other rehabilitation measures.

COURSE OBJECTIVES: At the end of the course, the student will be knowledgeable in the following:

1. Definition and epidemiology of Low Vision
2. Clinical examination of Low vision subjects
3. Optical, Non-Optical, Electronic, and Assistive devices.
4. Training for Low Vision subjects with Low vision devices
5. Referrals and follow-up

TEXT BOOKS:

1. Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998
2. Sarika G, Sailaja MVSE Vaithilingam: practice of Low vision –A guide book, Medical Research Foundation, 2015.

REFERENCE BOOKS:

1. Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
2. Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
3. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

COURSE PLAN:

1. Definitions & classification of Low vision
2. Epidemiology of low vision
3. Model of low vision service
4. Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision
5. Types of low vision aids – optical aids, non-optical aids & electronic devices
6. Optics of low vision aids
7. Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training
8. Pediatric Low Vision care
9. Low vision aids – dispensing & prescribing aspects
10. Visual rehabilitation &counseling
11. Legal aspects of Low vision in India
12. Case Analysis

GERIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: B.Optom/ M Optom/ Ph D with adequate experience in handling geriatric patients or Ophthalmologists.

COURSE DESCRIPTION: This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing ,and spectacle dispensing aspects in ageing patients.

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. Adequately gained knowledge on common ocular diseases.

TEXT BOOKS: A.J. ROSSENBLOOM Jr & M.W.MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.

REFERENCE BOOKS:

1. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
2. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN

1. Structural , and morphological changes of eye in elderly
2. Physiological changes in eye in the course of aging.
3. Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)
4. Optometric Examination of the Older Adult
5. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye
6. Contact lenses in elderly
7. Pharmacological aspects of aging
8. Low vision causes, management and rehabilitation in geriatrics.
9. Spectacle dispensing in elderly – Considerations of spectacle lenses and frames

PEDIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: Paediatric Ophthalmologist / Optometrist

COURSE DESCRIPTION: This course is designed to provide the students adequate knowledge in theoretical and practical aspects of diagnosis, and management of eye conditions related to paediatric population. Also it will inculcate the skill of transferring / communicating the medical information to the attender / patient by the students. The scope of this subject is to train the optometrists to develop a systematic way of dealing with children below 12, so as to implement primary eye care and have better, specialized management of anomalies.

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

1. Have a knowledge of the principal theories of childhood development, and visual development
2. Have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues
3. 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
4. Be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus
5. 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
6. Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.
7. Have a capacity for highly evolved communication and co-management with other professionals involved in paediatric assessment and care

TEXT BOOKS:

1. Pediatric Optometry - JEROME ROSNER, Butterworth, London 1982
2. Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004

REFERENCE BOOKS:

1. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis, 1980.
2. Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
3. Clinical pediatric optometry. LJ Press, BD Moore, Butterworth- Heinemann, 1993

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN

1. The Development of Eye and Vision
2. History taking Paediatric subjects

3. Assessment of visual acuity
4. Normal appearance, pathology and structural anomalies
 - of 4.1 Orbit, Eye lids, Lacrimal system,
 - 4.2 Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil
 - 4.3 Lens, vitreous, Fundus Oculomotor system
5. Refractive Examination
6. Determining binocular status
7. Determining sensory motor adaptability
8. Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia
9. Remedial and Compensatory treatment of Strabismus and Nystagmus
10. Paediatric eye disorders : Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics
11. Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism
12. Spectacle dispensing for children
13. Paediatric contact lenses
14. Low vision assessment in children

BINOCULAR VISION I

INSTRUCTOR INCHARGE: Optometrists with B. Optom and experience in Binocular vision course teaching. Or M. Optom or specialised fellowship in Binocular vision optometry.

COURSE DESCRIPTION: This course provides theoretical aspects of Binocular Vision and its clinical application. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extraocular muscles, various binocular vision anomalies, its diagnostic approaches and management.

COURSE OBJECTIVES: On successful completion of this module, a student will be expected to be able to:-

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 etiology, investigation and management of binocular vision anomalies.
3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

TEXT 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. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

PREREQUISITES: Ocular anatomy, Physiology

COURSE PLAN

1. Binocular Vision and Space perception.
 - 1.1 Relative subjective visual direction.
 - 1.2 Retino motor value
 - 1.3 Grades of BSV
 - 1.4 SMP and Cyclopean Eye
 - 1.5 Correspondence,
 - 1.6 Fusion, Diplopia, Retinal rivalry
 - 1.7 Horopter
 - 1.8 Physiological Diplopia and Suppression
 - 1.9 Stereopsis, Panum's area, BSV.
 - 1.10 Stereopsis and monocular clues - significance.
 - 1.11 Egocentric location, clinical applications.
 - 1.12 Theories of Binocular vision.
2. Anatomy of Extra Ocular Muscles.
 - 2.1 Rectii and Obliques, LPS.

- 2.2 Innervation & Blood Supply.
- 3. Physiology of Ocular movements.
 - 3.1 Center of rotation, Axes of Fick.
 - 3.2 Action of individual muscle.
- 4. Laws of ocular motility
 - 4.1 Donder's and Listing's law
 - 4.2 Sherrington's law
 - 4.3 Hering's law
- 5. Uniocular & Binocular movements - fixation, saccadic & pursuits.
 - 5.1 Version & Vergence.
 - 5.2 Fixation & field of fixation
- 6. Near Vision Complex Accommodation
 - 6.1 Definition and mechanism (process).
 - 6.2 Methods of measurement.
 - 6.3 Stimulus and innervation.
 - 6.4 Types of accommodation.
 - 6.5 Anomalies of accommodation – aetiology and management.
- 7. Convergence
 - 7.1 Definition and mechanism.
 - 7.2 Methods of measurement.
 - 7.3 Types and components of convergence - Tonic, accommodative, fusional, proximal.
 - 7.4 Anomalies of Convergence – aetiology and management.
- 8. Sensory adaptations 8.1
Confusion
- 9. Suppression
 - 9.1 Investigations
 - 9.2 Management
 - 9.3 Blind spot syndrome
- 10. Abnormal Retinal Correspondence
 - 10.1 Investigation and management
 - 10.2 Blind spot syndrome
- 11. Eccentric Fixation
 - 11.1 Investigation and management
- 12. Amblyopia
 - 12.1 Classification
 - 12.2 Aetiology
 - 12.3 Investigation
 - 12.4 Management
- 13. Introduction to Form perception
- 14. Introduction to Motion perception
- 15. Introduction to Temporal perception
- 16. Introduction to Psychophysical Methodology

SYSTEMIC DISEASES

INSTRUCTOR INCHARGE: General Medicine professional

COURSE DESCRIPTION: This course deals with definition, classification, clinical diagnosis, complications and management of various systemic diseases. In indicated cases ocular manifestations also will be discussed.

COURSE OBJECTIVES: At the end of the course, students should get acquainted with the following:

1. Common Systemic conditions: Definition, diagnostic approach, complications and management options
2. Ocular findings of the systemic conditions
3. First Aid knowledge

TEXT BOOKS:

1. C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002
2. Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999

COURSE PLAN

1. Hypertension
 - 1.1 Definition, classification, Epidemiology, clinical examination, complications, and management.
 - 1.2 Hypertensive retinopathy
2. Diabetes Mellitus
 - 2.1 Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications
 - 2.2 Diabetic Retinopathy
3. Thyroid Disease
 - 3.1 Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors
 - 3.2 Grave's Ophthalmopathy
4. Acquired Heart Disease
 - 4.1 Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm
 - 4.2 Ophthalmic considerations
5. Cancer :
 - 5.1 Incidence
 - 5.2 Etiology
 - 5.3 Therapy
 - 5.4 Ophthalmologic considerations
6. Connective Tissue Disease
 - 6.1 Rheumatic arthritis
 - 6.2 Systemic lupus erythematosus
 - 6.3 Scleroderma

- 6.4 Polymyositis and dermatomyositis
- 6.5 Sjogren syndrome
- 6.6 Behcet's syndrome
- 6.7 Eye and connective tissue disease
- 7. Tuberculosis
 - 7.1 Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.
- 8. Herpes virus (Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus)
 - 8.1 Herpes and the eye
- 9. Hepatitis (Hepatitis A, B, C)
- 10. Acquired Immunodeficiency Syndrome
- 11. Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations)
- 12. Common Tropical Medical Ailments
 - 12.1 Malaria
 - 12.2 Typhoid
 - 12.3 Dengue
 - 12.4 Filariases
 - 12.5 Onchocerciasis
 - 12.6 Cysticercosis
 - 12.7 Leprosy
- 13. Nutritional and Metabolic disorders:
 - 13.1 Obesity
 - 13.2 Hyperlipidaemias
 - 13.3 Kwashiorkor
 - 13.4 Vitamin A Deficiency
 - 13.5 Vitamin D Deficiency
 - 13.6 Vitamin E Deficiency
 - 13.7 Vitamin K Deficiency
 - 13.8 Vitamin B1,B2, Deficiency
 - 13.9 Vitamin C Deficiency
- 14. Myasthenia Gravis
- 15. First Aid
- 16. Psychiatry
 - 16.1 Basic knowledge of psychiatric condition and Patient Management
- 17. Genetics
 - 17.1 Introduction to genetics
 - 17.2 Organisation of the cell
 - 17.3 Chromosome structure and cell division
 - 17.4 Gene structure and basic principles of Genetics.
 - 17.5 Genetic disorders and their diagnosis.
 - 17.6 Genes and the eye
 - 17.7 Genetic counseling and genetic engineering.

RESEARCH METHODOLOGY AND BIOSTATISTICS

INSTRUCTOR INCHARGE: Biostatistician/Epidemiologist or Higher optometry holder with experience in biostatistics and research methodology

COURSE OBJECTIVES: The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

TEXT BOOKS:

1. Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., W. B. Saunders Co.
2. Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
3. Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

COURSE PLAN

Research Methodology

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Types of Data
6. Research tools and Data collection methods
7. Sampling methods
8. Developing a research proposal

Biostatistics

1. Basics of Biostatistics
 - 1.1 Introduction of Biostatistics
 - 1.2 Measures of Morality
 - 1.3 Sampling
 - 1.4 Statistical significance
 - 1.5 Correlation
 - 1.6 Sample size determination.
 - 1.7 Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion.
 - 1.8 Theoretical distributions.
 - 1.8.1 Binomial
 - 1.8.2 Normal
 - 1.8.3 Sampling –necessity of methods and techniques.
 - 1.8.4 Chi. Square test (2 x 2)
2. Hospital Statistics
3. Use of computerized software for statistics

CLINICAL OPTOMETRY IV (STUDENTSHIP)

INSTRUCTOR INCHARGE: B.Optom/ M Optom/ Ph D with adequate experience in handling clinics and teaching.

Course description

The course provides students the opportunity to continue to develop confidence and increased skill in diagnosis and treatment delivery. Students will demonstrate competence in basic, intermediate and advance procedure in those areas. Students will participate in advance and specialized diagnostic and management procedure. Students will get practical experience of the knowledge acquired from geriatric and paediatric optometry courses. Hands-on experience under supervision will be provided in various outreach programmes namely, school vision screening, glaucoma and diabetic retinopathy screening etc., Students also get hand-on practical sessions on the following courses namely, contact lens, low vision care, geriatric optometry and paediatric optometry.

Course Objectives

At the end of the semester, students must be able to perform objective and subjective with good accuracy, accommodative assessment and learn the slit lamp illumination techniques and application of the different illumination techniques. Additional area includes problem solving and complications of various managements will be inculcated.

Text books

1. David B Elliot, Clinical procedures in optometry, Butterworth – Heinmann, 2003

Reference books

1. Theodore Grosvener, primary care optometry, Butterworth – Heinmann
2. William J. Benjamin, Borish's Clinical refraction, Butterworth – Heinmann, 2006

Pre requisites: Visual optics, Optometric instruments, Clinical examination of visual system, Dispensing optics, Binocular vision

Course plan

1. Practicing objective and subjective refraction
2. Near Addition
3. Binocular vision assessment
4. Accommodation facility
5. Vergence facility
6. Positive & negative fusional vergence
7. Appalanation tonometry
8. Slit lamp illumination techniques
9. Management options

CONTACT LENSES II Theory

INSTRUCTOR INCHARGE : B.Optom or optometrists with higher qualification

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

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

- 1 Finalise the CL design for various kinds patients
- 2 Recognize various types of basic contact lens selection, fitting and recommendations
Explain all the procedures to patient
- 3 Identify and manage various adverse events of contact lens wear.

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN:

<p>1. Preliminary examination: All types of contact lenses – steps, significance, recording of results</p> <ul style="list-style-type: none">• Reasons for contact lens wear• Ocular, medical and contact lens history• Anatomical measurements• Refractive information• Binocular vision status• Slit-lamp evaluation• Tear film evaluation• Other considerations• Final analysis
<p>2. Soft Contact Lenses</p> <ul style="list-style-type: none">• SCLs fitting on spherical and astigmatic cornea and evaluation• Fitting philosophies, types, assessment and ordering• Fitting problem solving
<p>3. Rigid Gas Permeable contact lenses</p> <ul style="list-style-type: none">• Corneal topography & Contact lens practice• Tear lens calculations• RGPCLs fitting on spherical and astigmatic cornea and evaluation• Fitting philosophies, types and assessment and ordering• Fitting problem solving
<p>4. Soft Toric Contact Lens Fitting</p> <ul style="list-style-type: none">• Correction of astigmatism• Stabilisation techniques

<ul style="list-style-type: none"> • Lens selection, fit assessment and ordering • Fitting problem solving
5. RGP Toric Contact Lenses <ul style="list-style-type: none"> • Lens selection, fitting and assessment • Fitting techniques • Problem solving
6. Standard Contact Lens routine procedures
7. Indications and contraindications
8. Contact lens ordering – Rigid, Soft, TSCL, Multifocal etc. & Writing a prescription to the Laboratory
9. Complications of contact lenses <ul style="list-style-type: none"> • Inflammatory complications • Mechanical complications • Corneal swelling
10. Therapeutic contact lenses
11. Specialty contact lens fitting - Introduction <ul style="list-style-type: none"> • Keratoconus • Post-surgical • Children and contact lenses • Aphakia • Multifocal contact lenses • Contact lenses VDUs & other vocational purposes • CLs for oculomotor / sensory integrative conditions • Traumatic, sports and prosthetics
12. Patient referrals
13. Legal, professional and ethical obligations of contact lens practice.

CONTACT LENSES II Lab

INSTRUCTOR QUALIFICATION: M.Optom or optometrists with higher qualification, with contact lens specialization.

COURSE DESCRIPTION: The subject provides the student with suitable knowledge both in theoretical and practical aspects of basic contact lens practice.

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

- 1 Finalise the CL design for various kinds patients
- 2 Recognize various types of basic contact lens selection, fitting and recommendations
Explain all the procedures to patient
- 3 Identify and manage various adverse events of contact lens wear.

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments, Contact lens I and contact lens I – Lab.

COURSE OUTLINE

Insertion and removal of CL
Lid eversion + preliminary examination <ul style="list-style-type: none">• Upper lid eversion and examination• Tear-film investigations, and assessment• Ocular parameters measurements and lens selection• Slit-lamp examination• Patient selection, education and final assessment
All aspects of Soft spherical CL fitting <ul style="list-style-type: none">• Patient selection• Trial lens selection• Lens fitting, evaluation, over-refraction, and finalise the parameters• Lens ordering, verification and patient education
All aspects of Rigid gas permeable CL fitting <ul style="list-style-type: none">• Patient selection• Trial lens selection• Lens fitting, evaluation, over-refraction, and finalise the parameters• Lens ordering, verification and patient education
All aspects of Soft toric CL fitting <ul style="list-style-type: none">• Patient selection• Trial lens selection• Lens fitting, evaluation, over-refraction, and finalise the parameters• Lens ordering, verification and patient education

Contact Lens Complications

- Case scenarios and slide presentations

BINOCULAR VISION II

INSTRUCTOR INCHARGE: Optometrists with B. Optom and experience in Binocular vision course teaching. Or M. Optom or specialised fellowship in Binocular vision optometry

COURSE DESCRIPTION: This course deals with understanding of strabismus, its classification, necessary orthoptic investigations, diagnosis and non-surgical management. Along with theoretical knowledge it teaches the clinical aspects and application.

COURSE OBJECTIVES: 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.

TEXT 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, Lippincot Williams & Wilkins publishers

PREREQUISITES: Ocular Anatomy, Ocular Physiology, Binocular Vision –I.

COURSE PLAN:

1. Neuro-muscular anomalies
 - 1.1 Classification and etiological factors
2. History – recording and significance.
3. Convergent strabismus
 - 3.1 Accommodative convergent squint
 - 3.1.1 Classification
 - 3.1.2 Investigation and Management
 - 3.2 Non accommodative Convergent squint
 - 3.1.3 Classification
 - 3.1.4 Investigation and Management
4. Divergent Strabismus
 - 4.1 Classification
 - 4.2 A& V phenomenon
 - 4.3 Investigation and Management
5. Vertical strabismus
 - 5.1 Classification
 - 5.2 Investigation and Management

6. Paralytic Strabismus
 - 6.1 Acquired and Congenital
 - 6.2 Clinical Characteristics
7. Distinction from comitant and restrictive Squint
8. Investigations
 - 8.1 History and symptoms
 - 8.2 Head Posture
 - 8.3 Diplopia charting
 - 8.4 Hess chart
 - 8.5 PBCT
 - 8.6 Nine directions
 - 8.7 Binocular field of vision
9. Amblyopia and Treatment of Amblyopia
10. Nystagmus
11. Non-surgical Management of Squint
12. Restrictive Strabismus 12.1
 - Features
 - 12.2 Musculo-fascical anomalies
 - 12.3 Duane's Retraction syndrome
 - 12.4 Clinical features and management
 - 12.5 Brown's Superior oblique sheath syndrome
 - 12.6 Strabismus fixus
 - 12.7 Congenital muscle fibrosis
13. Surgical management

PUBLIC HEALTH AND COMMUNITY OPTOMETRY

INSTRUCTOR INCHARGE: Public Health professional or optometrist with public health and community optometry experience

COURSE DESCRIPTION: Introduction to the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario.

COURSE OBJECTIVES: At the end of the course students will be knowledgeable in the following areas:

1. Community based eye care in India.
2. Prevalence of various eye diseases
3. Developing Information Education Communication materials on eye and vision care for the benefit of the public
4. Organize health education programmes in the community
5. Vision screening for various eye diseases in the community and for different age groups.

TEXT BOOKS:

1. GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002
2. Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980
3. K Park: Park's Text Book of Preventive and Social Medicine, 19th edition,
4. Banarsidas Bhanot publishers, Jabalpur, 2007

REFERENCE BOOKS: MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002

PREREQUISITES: Ocular Disease, Visual optics, Optometric Instruments, Clinical Examination of Visual System

COURSE PLAN

1. Public Health Optometry: Concepts and implementation, Stages of diseases
2. Dimensions, determinants and indicators of health
3. Levels of disease prevention and levels of health care patterns
4. Epidemiology of blindness – Defining blindness and visual impairment
5. Eye in primary health care
6. Contrasting between Clinical and community health programs
7. Community Eye Care Programs
8. Community based rehabilitation programs
9. Nutritional Blindness with reference to Vitamin A deficiency
10. Vision 2020: The Right to Sight
11. Screening for eye diseases
12. National and International health agencies, NPCB
13. Role of an optometrist in Public Health
14. Organization and Management of Eye Care Programs – Service Delivery models
15. Health manpower and planning & Health Economics

16. Evaluation and assessment of health programmes
17. Optometrists role in school eye health programmes
18. Basics of Tele Optometry and its application in Public Health
19. Information, Education and Communication for Eye Care programs

PRACTICE MANAGEMENT

INSTRUCTOR INCHARGE: Management professional with masters' qualification in Management or Optometrist with experience of running private clinical services

COURSE DESCRIPTION: This course deal with all aspects of optometry practice management

– business, accounting, taxation, professional values, and quality & safety aspects.

COURSE OBJECTIVES: At the end of the course, student would have gained knowledge on various aspects of private optometric practice from Indian perspective.

TEXT BOOKS: Faculty to recommend

REFERENCE BOOKS: Faculty to recommend

PREREQUISITES: Basic Clinical experience

COURSE PLAN

1. Business Management:
 - 1.1 Practice establishment and development
 - 1.2 Stock control and costing
 - 1.3 Staffing and staff relations
 - 1.4 Business computerization
2. Accounting Principles
 - 2.1 Sources of finance
 - 2.2 Bookkeeping and cash flow
3. Taxation and taxation planning
4. Professionalism and Values
 - 4.1 Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
 - 4.2 Personal values- ethical or moral values
 - 4.3 Attitude and behaviour- professional behaviour, treating people equally
 - 4.4 Code of conduct , professional accountability and responsibility, misconduct
 - 4.5 Differences between professions and importance of team efforts
 - 4.6 Cultural issues in the healthcare environment

OCCUPATIONAL OPTOMETRY

INSTRUCTOR INCHARGE: Occupational Health professional and /or Optometrist with experience in occupational eye health

COURSE DESCRIPTION: This course deals with general aspects of occupational health, Visual demand in various job, task analysing method ,visual standards for various jobs , occupational hazards and remedial aspects through classroom sessions and field visit to the factories.

COURSE OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects:

1. In visual requirements of jobs;
2. In effects of physical, chemical and other hazards on eye and vision;
3. To identify occupational causes of visual and eye problems;
4. To be able to prescribe suitable corrective lenses and eye protective wear and
5. To set visual requirements, standards for different jobs.

TEXT BOOKS:

1. PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's text book of Occupational optometry. 1st edition, Published by Elite School of optometry , unit of Medical Research Foundation, Chennai, India , 2015
2. R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001

REFERENCE BOOKS:

1. G W Good: Occupational Vision Manual available in the following website:
www.aoa.org
2. N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999
3. J Anshel: Visual Ergonomics Handbook, CRC Press, 2005
4. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008

COURSE PLAN:

1. Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc
 - a. Acts and Rules - Factories Act, WCA,ESI Act.
2. Occupational Hygiene and Environmental monitoring
3. Electromagnetic Radiation and its effects on Eye
 - a. Sources
 - b. Radiation protective methods
4. Light
 - a. Definitions and units
 - b. Sources

- c. Standards
- 5. Color
 - a. Definition
 - b. Theories of color vision
 - c. Color defects
 - d. Color Vision tests
 - e. Colour vision Vs occupation
- 6. Occupational hazards and preventive/protective methods
- 7. Visual Task Analysis
- 8. Industrial Vision Screening
 - a. Modified clinical method and Industrial Vision test
- 9. Vision Standards – Railways, Roadways, Airlines
 - a. Visual demands
 - b. Problems faced
 - c. Visual functions
- 10. Visual Display Units
 - a. Types
 - b. Asthenopia
 - c. Computer vision syndrome
 - d. Facial Rash/ Dermatitis
 - e. Epilepsy
- 11. Contact lens and work
 - a. Various hazards for CL
 - b. Guidelines for eye safety at work place
- 12. Accidents and prevention
 - a. Causes
 - b. Prevention
 - c. Occupational Hazards
 - d. Occupational Diseases (General and eye)
 - e. Personal protective equipment
 - i. General
 - ii. Eye protection (lens and frame materials)
- 13. Pesticides and human health

MEDICAL LAW AND ETHICS

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

COURSE PLAN

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

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics –Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records –Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

CLINICAL OPTOMETRY V (STUDENTSHIP)

INSTRUCTOR INCHARGE: M Optom/ Ph D with adequate experience in handling clinics and teaching.

Course description

The course is the final series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship.

Course Objectives

At the end of the semester, students must be able to perform detailed eye examination along with optic disc examination and give required prescription, proper referral if needed. Adequate exposure to some of the diagnostic techniques and interpretation of the reports would be given. Additional area includes problem solving and complications of various managements will be inculcated.

Text books

1. David B Elliot, Clinical procedures in optometry, Butterworth – Heinmann, 2003

Reference books

1. Theodore Grosvener, primary care optometry, Butterworth – Heinmann
2. William J. Benjamin, Borish's Clinical refraction, Butterworth – Heinmann, 2006

Pre requisites: Visual optics, Optometric instruments, Clinical examination of visual system, Dispensing optics

Course plan

1. Detailed patient work up
2. AC/A ratio estimation
3. Fundus evaluation – 90 D, 78 D
4. Applanation tonometry
5. Gonioscopy
6. Diagnostic techniques, interpretation
7. Diplopia charting
8. Hess charting
9. Low vision assessment
10. Management options

Seventh and Eighth Semester

The internship time period provides the students the opportunity to continue to develop confidence and increased skill in diagnosis and management. Students will demonstrate competence in beginning, intermediate, and advanced procedures in above areas. Students will participate in advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 6 hours per day and this may be more depending on the need and the healthcare setting.

The students are expected to see different optometric cases during internship to become competent in handling the cases all alone at the end of their clinical internship. School of Medical Science, University of Hyderabad, has listed out the following area where the students need to be posted and get training. The list prepared based on CMOC, Optometry Council of India and ECOO guidelines. Each intern is expected to submit 20 cases per semester with detailed report based on Evidence Based Practice guidelines.

Below table is showing minimum number of cases to be observed / individually examined per candidate during clinical internship. Interns are expected to submit their monthly report (not more than one A4 page including bar graph) to the university. This may help School/Internship Center to guide students and provide opportunities to expose them to cases that are not examined by the individual candidate.

S. No	Department	Minimum number of cases to be seen (Observed + Independently seen)
1	General OPD: (strabismus, Neuro-ophthalmology, oculoplastic, cornea, glaucoma, retina)	250 + 150 = 400
2	Contact lenses: (Even distribution of the following cases is expected: RGP, soft, toric, speciality contact lenses and trouble shooting)	30+20=39
3	Opticals: (Even distribution of the following cases is expected: PALs, Bifocals, Single Vision, High Index, Paediatric, different BC (i.e. flat BC lenses) and Photochromatics)	50+50=150
4	Low Vision care clinic: (Even distribution of the following cases is expected: Stand magnifier, hand magnifier, technology aided devices, and telescopes)	20+10=30
5	Binocular vision clinic: (Even distribution of the following cases is expected: (BV anomalies, phorias, Tropias, Accommodative and convergence related disorders)	30+20=40
6	LASIK clinic: Expected to examine (pre & post-op) different refractive surgical patients. Have in	40+10

	depth knowledge, about the presentation and how the optical system alters following these	
	surgeries.	
7	Glaucoma diagnostic (Perimetry, pachymetry, OCT, GDx, HRT, Gonioscopy, tonometry)	40 + 16 (Perimetry 18 and rest all 8 each)
8	A-scan and B-scan	10 +10 (10 each)
9	Retinal diagnostics (ERG, EOG, VEP, fundus photo, Fluorescence angiography, IEC, OCT)	30 + 10 (8 each)
10	Eye screening Camps	Total number of camps to participate are 10
11	Mini project	1

Please attach copies of **forty patients (twenty patients per semester) records**

(that are independently seen) that demonstrate that your scope of practice matches that of the European Diploma.

Records required (per semester):

1. **5 primary care eye examinations** to include at least:
 - 2 binocular vision anomalies
 - 1 low vision case
 - 1 paediatric case (for this purpose paediatric is 12 years or under)
2. **5 abnormal ocular condition** cases to include at least 3 referrals
3. **5 contact lens cases** to include at least: 1 RGP fitting
4. **5 Dispensing** to include a range of different frame and lens types

In addition you should include details of the practices where this experience was gained, together with the name and contact details of internship center coordinator / Education department of the internship center, who can provide references confirming the dates during which the experience was gained together, if possible, with references confirming your scope of practice.

Please refer to Portfolio of Clinical Experience document for more information.

Project

During these semesters students also will do the research work and submit the final report and make presentation in front of the experts. It is essential to have one guide from the university and the other guide from Internship Center.

EPIDEMIOLOGY AND COMMUNITY EYE CARE

INSTRUCTOR INCHARGE: Public Health professional / Optometrist with higher degree and experience in teaching the course on epidemiology

COURSE OBJECTIVES: This course deals with the basics of ocular epidemiology and presents details on various eye diseases. It also introduces the students to the concepts of preventive measures and to inculcate the theoretical knowledge and clinical exposure of community optometry.

COURSE OUTCOMES:

1. Thorough understanding of epidemiological concepts.
2. Thorough understanding of conducting of screening for specific eye conditions, and resultant implications through theoretical and practical exposure.

TEXT BOOKS: Epidemiology of eye diseases: Johnson and Gordon

Pre requisites: Public Health & Community Optometry knowledge at Bachelors level

COURSE PLAN

1. Prevalence, incidence and distribution of visual impairment
2. Methodology
 - 2.1 Basics of Epidemiology study methods
 - 2.2 Types of study designs
 - 2.3 Screening for visual disorders
3. Childhood blindness
4. Refractive errors and presbyopia
5. Age related cataract
6. Low Vision
7. Diabetic retinopathy
8. Glaucoma
9. Age related Macular Degeneration
10. Vitamin A deficiency
11. Corneal and external diseases
12. Prevention strategies
13. Concept of Health and Disease
14. Principles of Epidemiology and Epidemiological Methods
15. Screening for Eye Disease – Refractive errors, Low Vision, Cataract, Diabetic retinopathy, Glaucoma, Amblyopia, Squint.
16. Blindness
17. Health Information and Basic Medical Statistics
18. Communication for Health Education
19. Health Planning and Management
20. Health care of community
- 21. How to plan and implement Vision2020**

OCULAR DISEASES AND DIAGNOSTICS - I

INSTRUCTOR IN CHARGE: Ophthalmologist/M. Optom

COURSE OBJECTIVES: Evidence based approach to Diagnosis, Clinical decision Making, Management and co management of anterior segment ocular diseases. Developing more reading ability of scientific journals for more evidence based management with recent understanding of diseases.

COURSE COMPETENCIES:

1. Ability to perform clinical decision making for Ocular abnormalities
2. Ability to perform and interpret corneal diagnostics including
 - 2.1 Topography/Pentacam/Orbscan
 - 2.2 Specular microscopy
 - 2.3 Pachymetry
 - 2.4 Abberometry
 - 2.5 AS OCT UBM
3. Ability to perform pre and post Lasik evaluation
4. Ability to interpret glaucoma diagnostic reports
 - 4.1 OCT
 - 4.2 HRT
 - 4.3 GDx
 - 4.4 Gonioscopy
 - 4.5 ONH evaluation
5. Ability to perform anterior segment photography
6. Ability to manage and co-manage therapeutics for anterior segment
7. Referral criteria

TEXT/ REFERENCE BOOKS:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

Pre requisites: Ocular Diseases and systemic disease knowledge at Bachelors level

COURSE PLAN:

1. Refresher of anterior segment ocular diseases, diagnosis and therapeutics
2. Refresher of glaucoma diagnosis and therapeutics
3. Surgical treatment of anterior segment diseases
4. Anterior segment Diagnostics
 - 4.1 Specular Microscopy
 - 4.2 Topography
 - 4.3 Corneal Hysteresis
 - 4.4 Orbscan, Pentacam
 - 4.5 Pachymetry
 - 4.6 Abberometry

- 4.7 AS OCT
- 4.8 HRT
- 4.9 GDx
- 4.10 ONH evaluation
- 4.11 Gonioscopy
Fluoresceinangiograph
- 4.12 y
- 4.13 Refractive surgery
- 4.14 Cataract evaluation

CLINICS 1

OBJECTIVES: The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics, and associated hospital and optical / optometric clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature.

Technical Communication:

INSTRUCTOR IN CHARGE: M. Optom / PhD with experience in written communication for journal, magazine and paper.

Course DESCRIPTION: The goal of this course is to prepare students with the individual and collaborative technical writing, presentation, and research skills necessary to be effective technical communicators in academic and professional environments.

COURSE OBJECTIVES:

- Understand how to apply technical information and knowledge in practical documents for a variety of a.) professional audiences (including peers and colleagues or management) and b) public audiences.
- Practice the unique qualities of professional writing style, including sentence conciseness, readability, clarity, accuracy, honesty, avoiding wordiness or ambiguity, previewing, using direct order organization, objectivity, unbiased analyzing, summarizing, coherence and transitional devices.
- Recognize, explain, and use the rhetorical strategies and the formal elements of these specific genres of technical communication: technical abstracts, data based research reports, instructional manuals, technical descriptions, web pages, wikis, and correspondence.
- Collect, analyze, document, and report research clearly, concisely, logically, and ethically; understand the standards for legitimate interpretations of research data within scientific and technical communities.
- Recognize and develop professional format features in print, html, and multimedia modes, as well as use appropriate nonverbal cues and visual aids.
- Revise and edit effectively in all assignments, including informal media

Pre requisites: project writing knowledge at Bachelors level

COURSE PLAN:

- 1) Role and importance of communication
- 2) Effectiveness in oral and written communication
- 3) Technical reports
- 4) Technical proposals
- 5) Technical descriptions
- 6) Definitions and classifications
- 7) Business correspondence
- 8) Precis writing
- 9) Memorandum
- 10) Notices
- 11) Agenda and Minutes
- 12) Oral communications related to meetings ,seminar, conferences
- 13) Group discussions
- 14) Use of modern communications aids

NEURAL BASIS of Vision & Visual perception

INSTRUCTOR IN CHARGE: M. Optom / PhD with experience in vision science.

COURSE DESCRIPTION: This course will be taught in one semester. Neural basis of Vision & Visual perception is the study of the neural schema for visual attributes, physical and physiological aspects of vision including the principals of psychophysical measurements.

OBJECTIVES: The objective of this course is to equip the students with a thorough knowledge and understanding, of the neural structure of the visual system , physical and physiological aspects of visual attributes such as colour, form, shape, depth and , motion. .Adding to this it would also equip the students with the basic principles underlying psychophysical methods.

TEXT BOOK:

1. Sensation and Perception, E. Bruce Goldstein
2. Visual Perception A clinical Orientation, Steven H Schwartz

PREREQUISITES: Ocular Anatomy, Ocular Physiology, Binocular Vision, Pediatric optometry.

COURSE PLAN

1. The neuronal System
 - a. Structure and function of the neurosensory retina, and RPE . ERG and its relationship to the physiology of the retina
 - b. How image on the retina is translated into visual information and how the brain processes the information
 - c. Visual receptors encoding and transmission of information through single neurons in the visual system. Relationship between this information and specific aspects of human vision
 - d. The central visual system and a variety of higher cerebral cortex areas are examined for their role in vision Role of Electrophysiological tests in examining the physiology of normal and abnormal visual system
- 2 Space Perception
 - a. Direction and depth discrimination (monocular and binocular cues, oculocentric and egocentric localization)
 - b. Characteristics of sensory function (binocular interactions including summation, binocular suppression and rivalry, corresponding points including horopter criteria)
 - c. Development of sensory fusion and binocular vision
 - d. Disturbances of perceived direction and distance (aniseikonia and amblyopia)
 - e. Sensory-motor interactions (fixation, disparity, past pointing, visually guided behaviour, body posture and perceived orientation, and self-motion)
- 3 Form Perception
 - a. Static visual acuity (including test configuration, various acuity tasks, and factors influencing acuity including blur, intensity and contrast), specification of visual acuity
 - b. Spatial contrast sensitivity function (including factors influencing the function)
 - c. Illusions,
 - d. Simultaneous contrast and spatial interactions (Mach bands)
- 4 Light Perception

- a. Detection characteristics at the absolute light threshold (including spectral, spatial, and temporal aspects)
- b. Brightness-difference thresholds at various adaptation levels (Weber's and DeVries-Rose Laws), specification of contrast
- c. Dark and light adaptation processes and theories
- d. Spatial and temporal summation characteristics (Ricco's, Piper's and Bloch's Laws)

5 Motion Perception

- a. Factors involved in the detection of real and apparent motion, detection of displacements
- b. Motion after-effects
- c. Dynamic visual acuity, visual performances with a moving object, and visual performances with a moving observer

6 Temporal Perception

- a. Critical flicker fusion frequency, including influencing factors (test object size, location and adaptation level)
- b. Sub-fusional flicker phenomena (Bartley brightness enhancement)
- c. Successive contrast and masking
- d. Temporal contrast sensitivity function
- e. Stabilised retinal images and monocular suppression (Troxler effect)
- f. Saccadic suppression

7 Color Perception

- a. Colour perception
- b. Chromatic discrimination (hue and saturation) for normal defective colour vision
- c. Colour mixture and appearance
- d. Colour contrast, constancy, and adaptation
- e. Colour specification and colorimetry (CIE)
- f. Spectral sensitivity of normal and defective colour vision
- g. Mechanisms of colour deficiencies

8 Psychophysical Methodology

- a. Basic psychophysical methods and theory
- b. Psychophysical scaling methods and theory
- c. Signal detection methods and theory

OCULAR DISEASES AND DIAGNOSTICS – II

INSTRUCTOR IN CHARGE: Ophthalmologist/M.Optom

COURSE OBJECTIVES: Evidence based approach to Diagnosis, Clinical decision Making, Management and co management of posterior segment diseases. Developing more reading ability of scientific journals for more evidence based management with recent understanding of diseases.

COURSE COMPETENCIES:

1. Ability to perform electro diagnostic procedures and interpret electro diagnostic reports
 - 1.1 ERG
 - 1.2 EOG
 - 1.3 VEP
2. Ability to perform stereoscopic fundus photography
3. Ability to use Ocular photography as tool for evidence based clinical decision making and progression analysis
4. Ability to perform posterior segment photography
5. Ability to manage and co-manage diseases and disorders of posterior segment

TEXT/ REFERENCE BOOKS:

1. Clinical Ophthalmology: Jack J Kanski
2. Diagnostics and imaging techniques in Ophthalmology: Amar Agarwal

Pre requisites: Ocular Diseases and systemic disease knowledge at Bachelors level. OCULAR DISEASES AND DIAGNOSTICS I.

COURSE PLAN:

1. Refresher of posterior segment ocular diseases, diagnosis and therapeutics
2. Surgical treatment of posterior segment diseases
 - 2.1 Posterior segment Diagnostics
 - 2.2 ERG
 - 2.3 EOG
 - 2.4 VEP
 - 2.5 OCT
 - 2.6 Fundus photography
 - 2.7 Neuro optometric diseases and disorders

ADVANCED CONTACT LENSES – I

INSTRUCTOR IN CHARGE: M.OPTOM/PhD/FIACLE

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the corneal oxygen requirements and recommend the best suitable contact lens for a particular condition. Management of ocular complications with contact lenses. Understand contact lens fitting for compromised corneas and keratoconus. The student should also be able to understand the fitting philosophy of orthokeratology and myopia control.

COURSE COMPETENCIES:

1. Ability to understand corneal physiology and oxygen needs
2. Ability to diagnose and manage complications due to contact lenses
3. Ability to fit specialized contact lenses
 - 3.1 Keratoconus
 - 3.2 Rose'Klenses
 - 3.3 Mini scleral lenses

TEXT/ REFERENCE BOOKS:

1. IACLE modules
2. Contact lenses – Stone and Philips

Pre requisites: basic contact lens knowledge at Bachelors level.

COURSE PLAN:

1. Anatomy and Physiology of the Cornea and related Structures
2. Contact Lens Materials
3. Microbiology, Lens Care and Maintenance
4. Tears and contact lenses
5. Optics and Lens Design
6. Clinical Instrumentation in contact lens practice
7. Rigid Gas Permeable corneal lens fitting
8. Soft contact lens fitting
9. Toric Contact lens fitting
10. Lens care regimen
11. Contact lens standards
12. Lens checking : Soft and Rigid
13. Contact lens complications
14. Special types of Contact lenses – diagnosis, surgery, protective, therapeutic, sports, partially sighted

PEDIATRIC OPTOMETRY AND BINOCULAR VISION

INSTRUCTOR IN CHARGE: M.Optom/FCOVD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the, basic concept behind visual perception, binocular vision anomalies and management and co- management of strabismic, non-strabismic binocular vision disorders and amblyopia.

COURSE COMPETENCIES:

1. Ability to diagnose and manage and co-manage binocular vision anomalies
2. Ability to co-manage visual perceptual anomalies
3. Ability to manage diplopia, suppression and ARC
4. Ability to manage amblyopia

TEXT/ REFERENCE BOOKS:

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press
3. Pediatric optometry: Jerome K Rosner

Pre requisites: basic pediatric optometry and binocular vision knowledge at Bachelors level.

COURSE PLAN:

1. Refractive Development:
 - 1.1 Early Refractive Development
 - 1.2 Visually Guided control of Refractive State: Animal Studies
 - 1.3 Infant Accommodation and Convergence
2. Oculomotor Function:
 - 2.1 Conjugate Eye Movements of Infants
 - 2.2 Development of the Vestibuloocular and Optokinetic reflexes
3. Spatial and Chromatic Vision:
 - 3.1 Front-end Limitations to Infant Spatial vision: Examination of two analyses
 - 3.2 Development of the Human Visual Field
 - 3.3 Development of Scotopic Retinal Sensitivity
 - 3.4 Infant Color vision
 - 3.5 Orientation and Motion selective Mechanisms in Infants
 - 3.6 Intrinsic Noise and Infant performance
4. Binocular Vision:
 - 4.1 Development of interocular vision in Infants
 - 4.2 Stereopsis in Infants and its developmental relation to visual acuity
 - 4.3 Sensorimotor Adaptation and Development of the Horopter
 - 4.4 Two stages in the development of Binocular Vision and Eye Alignment
5. Retinal and cortical Development
6. Abnormal Visual Development
7. What next in Infant Research
8. Clinical Applications:
 - 8.1 Assessment of Child Vision and Refractive Error

- 8.2 Refractive Routines in the Examination of Children
- 8.3 Cycloplegic Refraction
- 8.4 Color Vision Assessment in Children
- 8.5 Dispensing for the Child patient
- 8.6 Pediatric Contact Lens Practice
- 8.7 Dyslexia and Optometry Management
- 8.8 Electrodiagnostic Needs of Multiple Handicapped Children
- 8.9 Management Guidelines – Ametropia, Constant Strabismus
- 8.10 Management Guidelines – Amblyopia
- 8.11 Accommodation and Vergence anomalies
- 8.12 Nystagmus
- 8.13 Common genetic problems in Paediatric optometry
- 8.14 Pediatric Ocular Diseases
- 8.15 Ocular Trauma in Children
- 8.16 Myopia control
- 8.17 Clinical uses of prism

LOW VISION CARE AND GERIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: M.Optom/PhD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the best suitable low vision and functional assistive device for a particular condition and rehabilitation. This course gives both in-depth theoretical knowledge and clinical exposure in low vision care. The outcomes of this course are: Thorough understanding of the causes of the low vision, its functional and psychosocial consequences. Help visually impaired individuals to utilize their residual visual skills optimally and rehabilitate.

COURSE COMPETENCIES:

1. Ability to diagnose and manage patients with vision impairment
2. Ability to perform specialized diagnostics for patients with low vision with multiple disabilities
 - 2.1 Rudimentary vision
 - 2.2 Berkeley visual field test
 - 2.3 Hand disc perimetry
3. Ability to train for eccentric viewing and steady eye techniques
4. Ability to rehabilitate patients with VI with vocational counselling and activities of daily living

TEXT/ REFERENCE BOOKS: The lighthouse handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.

Pre requisites: basic low vision and geriatric optometry knowledge at Bachelors level.

COURSE PLAN

1. Visual Disorders – Medical Perspective
 - 1.1 The Epidemiology of Vision Impairment
 - 1.2 Vision Impairment in the pediatric population
 - 1.3 Ocular Diseases :
 - 1.3.1 Age – Related Cataract,
 - 1.3.2 Glaucoma
 - 1.3.3 ARMD
 - 1.3.4 Diabetic retinopathy
 - 1.3.5 Corneal Disorders
 - 1.3.6 Ocular Trauma
 - 1.3.7 Sensory Neuro-ophthalmology and Vision Impairment
 - 1.3.8 Refractive Disorders
2. Visual Disorders – The Functional Perspective
 - 2.1 Low Vision and Psychophysics
 - 2.2 Visual Functioning in Pediatric Populations with Low Vision
 - 2.3 Perceptual correlates of Optical Disorders
 - 2.4 Functional aspects of Neural Visual Disorders of the eye and Brain
 - 2.5 Visual Disorders and Performance of specific Tasks requiring vision
3. Visual Disorders – The Psychosocial Perspective
 - 3.1 Developmental perspectives – Youth

- 3.2 Vision Impairment and Cognition
- 3.3 Spatial orientation and Mobility of people with vision impairments
- 3.4 Social skills Issues in vision impairment
- 3.5 Communication and language: Issues and concerns
- 3.6 Developmental perspectives on Aging and vision loss
- 3.7 Vision and cognitive Functioning in old age
- 4. Interactions of Vision Impairment with other Disabilities and sensory Impairments.
 - 4.1 Children with Multiple Impairments
 - 4.2 Dual Vision and Hearing Impairment
 - 4.3 Diabetes Mellitus and Vision Impairment
 - 4.4 Vision Problems associated with Multiple Sclerosis
 - 4.5 Vision Impairment related to Acquired Brain Injury
 - 4.6 Vision and Dementia
 - 4.7 Low Vision and HIV infection
- 5. The Environment and Vision Impairment: Towards Universal Design
 - 5.1 Indian Disabilities act
 - 5.2 Children's Environments
 - 5.3 Environments of Older people
 - 5.4 Outdoor environments
 - 5.5 Lighting to enhance visual capabilities
 - 5.6 Signage and way finding
 - 5.7 Accessible Environments through Technology
- 6. Vision Rehabilitation:
 - 6.1 In Western Countries
 - 6.2 In Asia
 - 6.3 Personnel preparation in Vision Rehabilitation
- 7. Psychological and social factors in visual Adaptation and Rehabilitation
 - 7.1 The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Children and Youth
 - 7.2 The Role of psychosocial Factors in adaptation to vision Impairment and Habilitation outcomes for Adults and Older adults
 - 7.3 Social support and adjustment to vision Impairment across the life span
 - 7.4 The person – Environment perspective of vision impairment
 - 7.5 Associated Depression, Disability and rehabilitation
 - 7.6 Methodological strategies and issues in social research on vision Impairment and rehabilitation

CLINIC 2

The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature

RESEARCH METHODOLOGY

INSTRUCTOR IN CHARGE: M.Optom/PhD

COURSE OBJECTIVES: This course is designed to provide the students the basic knowledge in Bio-statistics. At the conclusion of the course, the students will have the knowledge of data collection, statistical application and finally, presentation of the statistical data.

COURSE OUTCOMES:

1. Ability to write research proposal/grant application
2. Ability to do statistical analysis
3. Ability to write research articles (Medical writing)
4. Ability to critically evaluate the research material

TEXT /REFERENCE BOOKS:

1. Methods in Biostatistics by B.K Mahajan
2. Probability and Statistics by Murray
3. Epidemiology of Eye Diseases, by Gordon and Drawin
4. Research Methodology by SM Israni

Pre requisites: basic research methodology knowledge at Bachelors level.

COURSE PLAN:

1. Need for Research in optometry
2. Introduction to research methods , Conducting a literature review , Research design ,Sampling methods , Data collection and data collection tools , Data analysis : Quantitative and Qualitatively ,Public health research , Issues in Research .Writing skills for students
3. Introduction and method of collecting and presenting of statistical data
4. Calculation and interpretation of various measures like mean, median, standard deviations, Skewness and Kurtosis
5. Probability distribution
6. Correlation and regression
7. Significance tests and confidence intervals
8. Parametric tests –
 - 8.1 Test for single proportion
 - 8.2 Test for Equality of proportions
 - 8.3 Test for single mean
 - 8.4 Test for equality of means
9. ANOVA:-
 - 9.1 One way
 - 9.2 Two way
10. Non parametric tests
 - 10.1 Chi-square tests
 - 10.2 Fisher’s exact test
 - 10.3 McNemar test
 - 10.4 Mann-whitney U-test
 - 10.5 Median test

- 10.6 Sign test
- 10.7 Wilcoxon test

ADVANCED CONTACT LENSES – II

INSTRUCTOR IN CHARGE:M.OPTOM/PhD/FIACLE

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the corneal oxygen requirements and recommend the best suitable contact lens for a particular condition. Management of ocular complications with contact lenses. Understand contact lens fitting for compromised corneas and keratoconus. The student should also be able to understand the fitting philosophy of orthokeratology and myopia control.

COURSE COMPETENCIES:

1. Ability to fit specialized contact lenses
 - 1.1 Keratoconus
 - 1.2 Rose' Klenses
 - 1.3 Mini scleral lenses
 - 1.4 Hybrid lenses
 - 1.5 Orthokeratology
 - 1.6 Scleral lenses: Dry eyes, SJS, Post PK, Post C3R, Post LASIK ectasia
2. Ability to fit custom made ocular prosthesis
3. Ability to fit pediatric contact lenses

TEXT/ REFERENCE BOOKS:

1. IACLE MODULES
2. CONTACT LENSES – STONE AND PHILIPS

Pre requisites: basic contact lens knowledge at Bachelors level and advanced contact lens I.

COURSE PLAN:

1. Extended and Continuous wear Lenses
2. Scleral Contact lenses
3. Bifocal and Multifocal contact lenses
4. Orthokeratology
5. Keratoconus
6. Post keratoplasty contact lens fitting
7. Post refractive surgery contact lens fitting
8. Pediatric contact lens fitting
9. Cosmetic and prosthetic contact lens fitting
10. Contact lens for abnormal ocular conditions
11. Contact lens and Myopia control
12. Legal issues and contact lenses
13. Contact lens manufacturing
14. Modifications procedures

LOW VISION CARE AND REHABILITATION

INSTRUCTOR IN CHARGE: M.Optom/PhD

COURSE OBJECTIVES: Upon completion of the course, the student should be able to understand the best suitable low vision and functional assistive device for a particular condition and rehabilitation. This course gives both in-depth theoretical knowledge and clinical exposure in low vision care. The outcomes of this course are: Thorough understanding of the causes of the low vision, its functional and psychosocial consequences. Help visually impaired individuals to utilize their residual visual skills optimally and rehabilitate.

COURSE COMPETENCIES:

1. Ability to diagnose and manage patients with vision impairment
2. Ability to perform specialized diagnostics for patients with low vision with multiple disabilities
3. Ability to train for eccentric viewing and steady eye techniques
4. Ability to rehabilitate patients with VI with vocational counselling and activities of daily living

TEXT/ REFERENCE BOOKS: The lighthouse handbook on vision impairment and Vision rehabilitation: Barbara Silverstone, Mary Ann Lang, Bruce Rosenthal, Faye.

Pre requisites: basic low vision knowledge at Bachelors level, and low vision care and geriatric optometry

COURSE PLAN:

1. Habilitation of Children and Youth with vision Impairment
2. Rehabilitation of working –age Adults with Vision Impairment
3. Rehabilitation of older Adults with Vision Impairment
4. Functional consequences of vision Impairment
5. Vision evaluation of Infants
6. Educational assessment of visual function in Infants and Children
7. Functional Evaluation of the Adult
8. Functional orientation and Mobility
9. Functional Assessment of Low Vision for Activities of Daily living
10. Psychosocial assessment of adults with vision impairment
11. Assistive Devices and Technology for Low Vision
12. Assistive Devices and Technology for Blind
13. Vision and Reading - Normal Vs Low Vision
14. Clinical Implications of color vision Deficiencies

VISION THERAPY

INSTRUCTOR IN CHARGE:FCOVD/M.Optom

COURSE OBJECTIVES: The course is designed to help expand the student's knowledge base in all aspects of behavioural vision care. Advanced competency is expected in the following principles and procedures for each clinical condition.

COURSE COMPETENCIES:

Principles and Procedures – The student should be able to define and explain:

1. The unique qualities, scientific, and clinical principles of each clinical condition.
2. The epidemiological and demographic characteristics of each clinical condition.
3. The characteristic history, signs and symptoms for each clinical condition.
4. How to assess each clinical condition, including specific test protocols and their interpretation.
5. The differential diagnosis for each clinical condition.
6. The specific treatment and management of each clinical condition including:
 - 6.1 Prognostic indicators
 - 6.2 Treatment options
 - 6.3 Duration and frequency of treatment
 - 6.4 Treatment philosophy and goals
 - 6.5 Specific lens treatment and therapy procedures including rationale for treatment
 - 6.6 Ergonomics and visual hygiene
 - 6.7 Outcomes to determine successful completion of treatment
 - 6.8 Frequency of follow-up care and patient instructions
 - 6.9 Referral criteria (medical, neurological, educational, etc.)

TEXT/ REFERENCE BOOKS:

1. Clinical management of binocular vision Mitchell Scheiman and Bruce Wick
2. Applied concepts in vision therapy: Leonard Press

Pre requisites: basic binocular vision knowledge at Bachelors level, and Pediatric optometry and binocular vision

COURSE PLAN:

1. Clinical Conditions
 - 1.1 Strabismus and Amblyopia
 - 1.1.1 Amblyopia
 - Anisometropic / Isometropic Refractive Amblyopia
 - Strabismic Amblyopia
 - Hysterical Amblyopia
 - Form Deprivation Amblyopia
 - Differential diagnoses in childhood visual acuity loss
 - 1.1.2 Strabismus
 - Esotropia-
 - o Infantile
 - o Accommodative

- o Acquired
 - o Microtropia
 - o Sensory
 - o Convergence Excess
 - o Divergence Insufficiency
 - o Non-accommodative
 - o Sensory Adaptations
 - Exotropia
 - o Divergence Excess
 - o Convergence Insufficiency
 - o Basic Exotropia
 - o Congenital
 - o Sensory
 - o Vertical Deviations
 - o Noncomitant Deviations (AV Syndrome; Duane's Retraction Syndrome; Brown's Syndrome; III, IV, VI nerve palsy, etc.)
 - o Differential diagnoses in strabismus
 - Special clinical considerations
 - o Anomalous Correspondence
 - o Eccentric Fixation
 - o Suppression
 - o Motor Ranges
 - o Stereopsis
 - o Horror fusionalis/intractable diplopia
- 1.2 Perception and Information Processing
- 1.2.1 Neurological / Psychological
- Ambient / focal systems.
 - Visual perceptual midline
 - Parvo cellular / Magno cellular function
 - Perceptual Style (central, peripheral)
 - Impact of colored filters
 - Attention
- 1.2.2 Intersensory and Sensorimotor Integration
- Visual-auditory
 - Visual-vestibular
 - Visual-oral
 - Visual-motor
 - Visual-tactual
- 1.2.3 Performance indicators
- Laterality and directionality
 - Visual requirements for academic success
 - Bilaterality
 - Gross and fine motor ability
 - Form perception/visual analysis
 - Spatial awareness
 - Visualization

- Visual memory
 - Visual sequential memory
 - Form constancy
 - Visual speed and visual span
 - Visual sequencing
- 1.3 Refractive conditions and visual skills
- 1.3.1 Refractive Conditions
- Developmental influence on refraction & Emmetropization
 - Aniseikonia
 - Myopia
 - Astigmatism
 - Hyperopia
 - Eye movements and reading
 - Pursuit dysfunctions
 - Nystagmus
 - Saccadic Dysfunctions
 - Role in myopia development
 - Role in computer-related asthenopia
- 1.3.4 Fusion in Non-Strabismic Conditions
- Fixation disparity
 - Motor fusion
 - Sensory fusion
- 1.4 Special clinical conditions
- 1.4.1 Acquired brain injury (traumatic brain injury {TBI} and stroke)
- 1.4.2 Developmental disabilities (Down Syndrome, Developmental delay, etc.)
- 1.4.3 Visually induced balance disorders
- 1.4.4 Motor disabilities (Cerebral Palsy, ataxia, etc.)
- 1.4.5 Behavioral disorders
- 1.4.6 Autism spectrum disorders
- 1.4.7 ADD / ADHD
- 1.4.8 Dyslexia and specific reading disabilities
- 1.4.9 Learning Disabilities
- 1.4.10 Computer Vision Syndrome
2. Vision Therapy Concepts to Consider
- 2.1 Peripheral awareness:
- 2.1.1 focal / ambient roles
- 2.1.2 Significant findings which are good or poor prognostic indicators of vision therapy and lens application
- 2.1.3 Development, rehabilitation, prevention, enhancement
- 2.1.4 Behavioral lens application
- 2.1.5 Yoked prism rationale for treatment and application
- 2.1.6 The relationship between the visual and vestibular systems
- 2.1.7 SILO/SOLI
- 2.1.8 Visual stress and its impact on the visual system
- 2.1.9 Role of posture in vision development, comfort and performance
- 2.1.10 Disruptive therapy: Discuss this type of therapy and how it can be used as a clinical therapeutic tool.

- 2.1.11 Relationship of speech-auditory to vision
- 2.1.12 How television, reading, video gaming might restrict movement, computer work, nutrition, etc., impact vision?
- 2.1.13 Perceptual Style, e.g., spatial/temporal, central/peripheral

RESEARCH PROJECT:

Data Collection, Literature search , Presentation of the progress of the project to the guide.

CLINIC 3:

OBJECTIVES: The objective of clinics in this semester is to be able to examine the eye and understand the all eye procedures with clinical management.

An approximate of guided 240 hours needs to be completed in this semester. The students will be by rotation go to community clinics, Campus clinics.

The logbook has to be maintained and case sheets of each subject in the semester with complete management and follow up are mandatory for submission at the end of the semester

The log book needs to be signed by the supervisor during every visit. No case record will be considered without the supervisor's signature

RESEARCH PROJECT:

Literature search, Data analysis, Interim Analysis, Thesis write-up, Presentation of the research work in front of the experts, and manuscript write –up for journal

CLINIC 4: