GALGOTIAS UNIVERSITY

Syllabus of

Bachelor of Optometry

Name of School: School of Medical & Allied Sciences

Department: Paramedical and Allied Health Sciences

Year: 2016-2020

School of Medical and Allied Sciences

GALGOTIAS UNIVERSITY

(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

Program: B. Optometry

Scheme: 2016 – 2020

Course Curriculum

Year I (Semester I)

S. No	Course Code	Subject	L	T	P	C	Evaluation Scheme		
							Internal	External	Total
1.	OPT101	Anatomy -I	3	0	0	3	30	70	100
2.	OPT102	Physiology - I	3	0	0	3	30	70	100
3.	OPT103	Basic Biochemistry	3	0	0	3	30	70	100
4.	EVS102	Energy and Environmental Sciences	3	0	0	3	30	70	100
5.	OPT151	Anatomy- I (P)	0	0	2	1	30	70	100
6.	OPT152	Physiology- I (P)	0	0	2	1	30	70	100
7.	OPT153	Basic Biochemistry-I (P)	0	0	2	1	30	70	100
		Total credits				15			
Semester- II									
1.	OPT104	Ocular Anatomy	3	0	0	3	30	70	100
2	OPT105	Ocular Microbiology	3	0	0	3	30	70	100
3	OPT106	Computer Fundamentals	3	0	0	3	30	70	100
4	OPT 107	Physical Optics	3	0	0	3	30	70	100
5	OPT 108	Nutrition	3	0	0	3	30	70	100
6	OPT154	Ocular Microbiology (P)	0	0	2	1	30	70	100
7	OPT155	Physical Optics (P)	0	0	2	1	30	70	100
8	OPT156	Computer Fundamentals (P)	0	0	2	1	30	70	100
		Total credits				18			

Year II (Semester III)

S. No	Course Code	Subject	L	T	P	C	Evaluation Scheme		
							Internal	External	Total
1.	OPT201	Ocular Pharmacy and Pharmacology	3	0	0	3	30	70	100
2.	OPT202	Refraction	3	0	0	3	30	70	100
3.	OPT203	Ocular disease(Anterior Segment)	3	0	0	3	30	70	100
4.	ENG131	Communicative English-1	2	0	0	2	30	70	100
5.	OPT251	Ocular pharmacy and pharmacology (Lab)	0	0	2	1	30	70	100
6.	OPT252	Refraction (Lab)	0	0	2	1	30	70	100
7.	OPT253	Ocular disease (Anterior Segment) (Lab)	0	0	2	1	30	70	100
8.	ENG181	Communicative English-1(P)	0	0	2	1	30	70	10
		Total credits				15			

Semester IV

1.	OPT204	Ophthalmic instruments and appliances	3	0	0	3	30	70	100
2.	OPT205	Visual Optics & Lighting of the Eye	3	0	0	3	30	70	100
3.	OPT206	Ophthalmic Lens & Dispensing Optics	3	0	0	3	30	70	100
4.	OPT207	Binocular Vision -I	3	0	0	3	30	70	100
5.	ENG231	Communicative English-II	2	0	0	2	30	70	100
6.	OPT254	Ophthalmic instruments and appliances (Lab)	0	0	2	1	30	70	100
7.	OPT255	Visual Optics & Lighting of the Eye (Lab)	0	0	2	1	30	70	100
8.	OPT256	Ophthalmic Lens & Dispensing Optics (Lab)	0	0	2	1	30	70	100
9.	ENG281	Communicative English-II (P)	0	0	2	1	30	70	100
		Total credits				18			

Year III (Semester V)

S. No	Course Code	Subject	L	T	P	C	Evaluation Scheme		
							Internal	External	Total
1.	OPT301	Binocular Vision- II	3	0	0	3	30	70	100
2.	OPT302	Contact lens-I	3	0	0	3	30	70	100
3.	OPT303	Low Vision Aids & Visual Rehabilitation	3	0	0	3	30	70	100
4.	OPT304	Pathology	3	0	0	3	30	70	100
5.	OVT305	Vision Technician-I	3	0	0	3	30	70	100
6.	OPT351	Binocular Vision- II (Lab)	0	0	2	1	30	70	100
7.	OPT352	Contact lens-I (Lab)	0	0	2	1	30	70	100
8.	OPT353	Low Vision Aids & Rehabilitation(Lab)	0	0	2	1	30	70	100
9.	OVT354	Vision Technician-I(Lab)	0	0	2	1	30	70	100
		Total credits				19			

Semester- VI

1.	OPT305	Systemic Condition & the Eye (Posterior Segment Disease)	3	0	0	3	30	70	100
2.	OPT306	Geriatric & Pediatric Optometry	3	0	0	3	30	70	100
3.	OPT307	Contact lens-II	3	0	0	3	30	70	100
4.	OPT308	Dispensing Optometry	3	0	0	3	30	70	100
5.	OVT309	Vision Technician-II	3	0	0	3	30	70	100
6.	OPT354	Systemic Condition & the Eye (Posterior Segment Disease) (Lab)	0	0	2	1	30	70	100
7.	OPT355	Contact lens-II(Lab)	3	0	2	1	30	70	100
8.	OPT356	Dispensing Optometry(Lab)	0	0	2	1	30	70	100
9.	OVT357	Vision Technician-II(Lab)	0	0	4	2	30	70	100
		Total credits				20			

Year IV Semester VII

S.No	Course Code	Subject	L	T	P	C	Evaluation Scheme		
							Internal	External	Total
1.	OPT401	Clinical Internship Including Project Work	0	0	40	20	30	70	100
		TOTAL			20				

Semester VIII

S.No	Course Code	Subject	L	T	P	C	Evaluation Scheme		
							Internal	External	Total
1.	OPT402	Clinical Internship Including Project Work	0	0	40	20	30	70	100
		TOTAL			20				
		Total Credits				150			

NOTE:

L – Lecture T- Tutorial P- Practical C-Credits J- Project Work

CBL-Credit Based Learning

PBL-Project Based Learning

HSS-Healthcare Sector Skill Council

School of Medical and Allied Sciences

Name of The Course	Anatomy-I			
Course Code	OPT101			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

1. Describe the gross structure of human body
2. Describe , specifically musculo-skeletal, Cardio-respiratory and nervous system.
3. Apply the anatomical principles in the practice of Optometry.

Course Outcomes:

CO1	To identify and describe the structure of various systems of the Human Body- especially Musculo-skeletal system, Cardio-vascular system.
CO2	To identify and palpate the various joints, muscles, nerves and other soft tissues of the upper and lower extremities and the organs in the thoracic cavity.
CO3	To be able to apply the knowledge for the assessment of pathological conditions (orthopedic conditions,) and differentiation of normal anatomical structure from the pathological conditions.
CO4	To be able to apply the knowledge for the assessment of pathological conditions (Neurological conditions, cardio-vascular conditions) and differentiation of normal anatomical structure from the pathological conditions. .
CO5	To be able to apply the knowledge for the assessment of pathological conditions (cardio-vascular conditions) and differentiation of normal anatomical structure from the pathological conditions.

Text Books

1. BD Chaurasia: Handbook of general Anatomy, Third edition, CBS Publishers, New Delhi, 1996
2. GJ Tortora, B Derrickson: Principles of Anatomy and Physiology,11th edition, John Wiley & Sons Inc, 2007

Reference Books

1. H.McMinn, John Pegington, Peter H. Abrahams. A Color Atlas of Human Anatomy 3rd edition, M, Mosby, 1996, ISBN: 978-0815158585
2. Richard S. Snell. Clinical Anatomy for Medical Students 6th edition, Lippincott Williams & Wilkins, 2000, ISBN: 9780781715744
3. Derek Field. Field's Anatomy, Palpation and Surface Marking 4th edition, Butterworth-Heinemann Ltd, 2006, ISBN : 978-0750688482

Course Content

Unit I 8 Hrs

- Introduction and concepts
- Terminologies
- Muscle classification, structure and functional aspect.
- Nerve-structure, classification with examples.
- Neurons-classification with examples, simple reflex arc. Parts of typical spinal curve/Dermatomes.
- Joints-classification, structures of joint, movements, range limiting factors, stability, blood supply, nerve supply, dislocations and applied anatomy.

School of Medical and Allied Sciences

Unit II 8 Hrs

- Circulatory system-Parts of heart, blood supply, major arteries and veins of the body, structure of blood vessels.
- Lymphoid system-circulation & function, lymphoid organs and their structure and functions.
- Integumentary system, Skin & its appendages, flexion creases, Langer's lines, Superficial and Deep Fascia, Tendons, Ligaments, aponeuroses, bursae

Unit III 8 Hrs

UPPER EXTRIMITY

- Bony architecture
- Joints – structure, range of movement
- Muscles – origin, insertion, actions, nerve supply
- Major nerves – course, branches and implications of nerve injuries
- Surface Anatomy

Unit IV 8 Hrs

UPPER EXTRIMITY

- Bony architecture
- Joints – structure, range of movement
- Muscles – origin, insertion, actions, nerve supply
- Major nerves – course, branches and implications of nerve injuries
- Surface Anatomy

Unit V 8 Hrs

THORAX

- Thoracic cage
- Pleural cavities & Pleura
- Lungs and Respiratory tree
- Mediastinum & Pericardium
- Heart and great vessels
- Diaphragm & Surface Anatomy

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
	30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	Physiology-I			
Course Code	OPT102			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The basic objective of this course is to get familiar with human physiology

Course Outcomes:
At the end of the course, students will be able to:

CO1	On completion of this course, the students will be able to understand-scope and importance of cell,
CO2	On completion of this course, the students will be able to understand-scope and importance of cell physiological laws
CO3	On completion of this course, the students will be able to understand-scope and importance of blood groups.
CO4	On completion of this course, the students will be able to understand-scope and importance of blood transfusion.
CO5	On completion of this course, the students will be able to understand-scope and importance of fundamentals of different organ systems.

Text Books

1. . A.K Jain, Human Physiology
2. Chatterjee, C C, Human Physiology, Medical Allied Agency

Reference Books

1. Guyton, Arthur, Text Book of Physiology, Prism Publishers
2. Chatterjee, C C, Human Physiology, Medical Allied Agency

Course Content:

Unit I 8 Hrs **Cell** Definition, Structure and function of Cytoplasmic Organelles, Reproduction-Meosis, Mitosis.
Unit II 8 Hrs **The important physico-chemical laws applied to physiology** Diffusion, Osmosis, Bonding, Filtration, Dialysis, Surface Tension, Adsorption, Colloid.
Unit III 8 Hrs **Introduction- composition and function of blood** Red blood cells- Erythropoiesis, stages of differentiation function, counts physiological Variation. Haemoglobin -Structure, function, concentration physiological variation. Methods of Estimation of Hb, White blood cell- Production, function, life span, count, differential count. Platelets- Origin, normal count, morphology functions. Plasma Proteins- Production, concentration, types, albumin, globulin, fibrinogen, Prothrombin functions. Haemostasis & Blood coagulation. Haemostasis – Definition, normal haemostasis, clotting factors, mechanism of clotting disorders of clotting factors. Blood Bank, Blood groups- A, B, O system, Rh system,

School of Medical and Allied Sciences

Unit IV	8 Hrs
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.	
Unit V	8 Hrs
Respiration: Mechanics of respiration – pulmonary function tests – transport of respiratory gases- neural and chemical regulation of respiration – hypoxia, cyanosis, dyspnoea – asphyxia. Excretion: Body fluids – distribution, measurement & exchange, Kidney – structure of nephron – mechanism of urine formation – composition of the urine and abnormal constituents – urinary bladder & micturition	

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
	30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	Basic Biochemistry			
Course Code	OPT103			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To understand the basic biochemistry.

Course Outcomes

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

CO1	On completion of this course, the students will be able to understand Structure, function and interrelationship of biomolecules
CO2	On completion of this course, the students will be able to understand consequences of deviation from normal
CO3	On completion of this course, the students will be able to understand. Integration of the various aspects of metabolism, and their regulatory pathways
CO4	On completion of this course, the students will be able to understand Principles of various conventional and specialized laboratory investigations
CO5	On completion of this course, the students will be able to understand analysis and interpretation of a given data.

Text 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

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

Course Content

Unit I 8 Hrs Carbohydrates: Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function) .
Unit II 8 Hrs Proteins: Amino acids, peptides, and proteins (general properties & tests with a few examples like glycine, trytophan, glutathione, albumin, hemoglobin, collagen)
Unit III 8 Hrs Lipids: Fatty acids, saturated and unsaturated, cholesterol and triacyglycerol, phospholipids and plasma membrane
Unit IV 8 Hrs Vitamins: General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)

School of Medical and Allied Sciences

Unit V	8 Hrs
Minerals: Na, K, Ca, P, Fe, Cu and Se(requirements, availability and properties) Mode of Evaluation: The theory and lab performance of students are evaluated separately	

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
	30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	Energy and Environmental Sciences			
Course Code	EVS102			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To develop awareness about our environment.

To develop a concern about sustainable development

Course Outcomes
At the end of the course, students will be able to:

CO1	Understand About environment and its components and Problems associated with natural resources and their sustainable use
CO2	Chemical Toxicity of the chemicals in the environment and Sources of pollution in air , water and soil and Solid waste management and natural Disaster management
CO3	Understanding about social issues
CO4	Understanding of role of information technology to address environmental issues.
CO5	Application of sustained Chemistry

Text Books

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2008, ISBN:978-81-224-2159-0.
2. Environmental Studies, Suresh K. Dhameja, S.K. Kataria and Sons , 2008, ISBN: 81-88458-77-5
3. Text Book of Environmental Studies, Erach Bharucha, University Press (India) Private Limited, 2005,ISBN: 978 81 7371 540 2
4. Environmental Studies (From Crisis to Cure) Second Edition. , R. Rajagopalan, Oxford University Press, 2012, ISBN 0-19-807208-2.
5. Environmental Studies, Ranu Gadi, Sunitta Rattan, Sushmita Mohapatra, S.K. Kataria and Sons , 2008, ISBN: 81-89757-98-9.

Reference Books

1. Environmental Studies , Benny Joseph , Tata McGraw Hill Education Private Limited, 2009, ISBN: 987-0-07-064813-5.
2. Environmental Studies, Anindita Basak, Pearson Education, 2009, ISBN: 978-81-317-2118-6.
3. Principles of Environmental Science (Inquiry and Applications), William P. Cunningham & Mary Ann Cunningham, Tata McGraw Hill Education Private Limited,2007, ISBN: 987-0-07-064772-0.

Course Content

Unit I: Environment & Natural Resources **8 hours**

Definition, scope, importance, need for public awareness, Environmental Management Systems its objectives, components, EIA, Natural Resources – forest resources – use, exploitation, deforestation, construction of multipurpose dams – effect on forests, Water resources – use of surface and subsurface water; effect of floods, drought, water conflicts, Mineral resources – Use and exploitation, environmental effects of extracting and using mineral resources, Food resources – food problems, advantage and disadvantage of fertilizers & pesticides, effect on environment, Energy resources – need to develop renewable energy, land resources – Land degradation, landslides, soil erosion, desertification & case studies.

School of Medical and Allied Sciences

Unit II: Chemical Toxicology **8 hours** Toxic chemicals in the environment, Impact of toxic chemicals on enzymes, biochemical effects of arsenic, cadmium, lead, chromium, mercury, biochemical effects of pesticides
Unit III: Environmental Pollution **8 hours** Definition – Causes, pollution effects and control measures of Air, Water, Soil, Marine, Noise, Thermal, Nuclear hazards. Solid waste management: causes, effects and control measures of urban and industrial wastes, pollution measures, case studies, Disaster management: floods, earthquake, cyclone and landslides.
Unit IV : Social Issues, Human Population and the Environment **8 hours** Urban problems related to energy & sustainable development, water conservation, problems related to rehabilitation – case studies, Consumerism and waste products - Environment Protection Act, Air, Water, Wildlife, Forest Conservation Act, Environmental legislation and public awareness. Population growth, variation among nations, Population explosion, Environment and human health, Value Education, Women and Child Welfare, Role of Information Technology – Visit to local polluted site /Case Studies.
Unit V: Green Chemistry **9 hours** Introduction, Basic principles of green technology, concept of Atom economy, Tools of Green technology, zero waste technology.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
	30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	ANATOMY-I (P)				
Course Code	**OPT151**				
Prerequisite					
Corequisite					
Antirequisite					
		L	**T**	**P**	**C**
		0	**0**	**2**	**1**

Course Objective:

1. Describe the gross structure of human body
2. Describe , specifically musculo-skeletal, Cardio-respiratory and nervous system.
3. Apply the anatomical principles in the practice of Optometry.

Course Outcomes:

CO1	Students should able to understand the normal disposition,inter relationships, gross functional and applied anatomy of various structures in the human body

Text Books

3. BD Chaurasia: Handbook of general Anatomy, Third edition, CBS Publishers, New Delhi, 1996
4. GJ Tortora, B Derrickson: Principles of Anatomy and Physiology,11th edition, John Wiley & Sons Inc, 2007
5. .

Reference Books

4. H.McMinn, John Pegington, Peter H. Abrahams. A Color Atlas of Human Anatomy 3rd edition, M, Mosby, 1996, ISBN: 978-0815158585
5. Richard S. Snell. Clinical Anatomy for Medical Students 6th edition, Lippincott Williams & Wilkins, 2000, ISBN: 9780781715744

Derek Field. Field's Anatomy, Palpation and Surface Marking 4th edition, Butterworth-Heinemann Ltd, 2006, ISBN : 978-0750688482

List of Experiments:

1. Introduction of skeletal system
2. To study of the upper limb bones
3. To study of the lower limb bones
4. To study of the Axial skeleton bones (vertebrae and rib cage)
5. To study of the skull bones
6. To demonstration of microscopic structure of vein and artery

Continuous Assessment Pattern

Internal Assessment (IA)	End Term Test (ETE)	Total Marks
30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	**Physiology-I (P)**				
Course Code	OPT152				
Prerequisite					
Corequisite					
Antirequisite					
		L	**T**	**P**	**C**
		0	**0**	**2**	**1**

Course Objective

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.

Course Outcome

CO-I	Explain the normal functioning of various organ systems of the body and their interactions

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

List of Experiments:

1. Introduction to Microscope.
2. To demonstate the ABO blood grouping given blood sample by the slide method
3. Demonstration of RH typing by slide method
4. To determine the hemoglobin of the given sample of blood or ones own blood by the sahils method
5. To demonstate total leukocyte count by the heamocymeter
6. Experiment to find normal clooting time
7. Experiment to find normal bleeding time.

Continuous Assessment Pattern

Internal Assessment (IA)	End Term Test (ETE)	Total Marks
30	**70**	**100**

School of Medical and Allied Sciences

Name of The Course	Basic Biochemistry-I (P)			
Course Code	OPT153			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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, 2ndedition, Butterworth Heinemann, Pennsylvania, 2003

Course Outcome

CO-I	Students should able to understand strucutre, function, interrelationship of biomolecules,priciples of various aspects of metobolism and their regulatory pathways

LIST OF EXPERIMENTS:

1. Qualitative analysis of abnoraml constitutes of urine
2. Demonstration of blood gas and electrolytes
3. Demonstration of glucometer
4. Qualitative analysis of unknown cardohydrates
5. Demonstration of osazone reaction
6. Estimation of photometry- standard graphs for estimation of serum- blood glucose and proteins

Continuous Assessment Pattern

Internal Assessment (IA)	End Term Test (ETE)	Total Marks
30	70	100

School of Medical and Allied Sciences

Name of The Course	**Ocular Anatomy**			
Course Code	**OPT104**			
Prerequisite				
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Objective:

The objective of the course is 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.

Course Outcomes

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

CO1	Relate the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa.
CO2	Generalise the microscopic structures of various tissues in the eye and correlate the structure with the functions.
CO3	Generalise the basic structure and connections between the various parts of the central nervous system and the eye so as Understand the neural connections and distribution.
CO4	Generalise the basic principles of ocular embryology
CO5	Generalise the basic principles of ocular embryology

Text Books

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

Reference Books

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

Course Content

Unit I: Central nervous system	**8 hours**
1.1 Spinal cord and brain stem 1.2 Cerebellum 1.3 Cerebrum.	
Unit II: Orbit	**8 hours**
Orbit 2.1 Eye 2.2 Sclera 2.3 Cornea 2.4 Choroid 2.5 Ciliary body 2.6 Iris 2.7 Retina	
Unit III: Refractory media-	**8 hours**
3.1 Aqueous humor	

School of Medical and Allied Sciences

3.2 Anterior chamber 3.3 Posterior chamber 3.4 Lens 3.5 Vitreous body	
Unit IV : Eyelids Eyelids	**8 hours**
Unit V: Conjunctiva Conjunctiva, Embryology	**8 hours**

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
10	**20**	**70**	**100**

OPT 105	OCULAR MICROBIOLOGY	L	T	P	C
Version	**Date of Approval:**	**3**	**0**	**0**	**3**
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the ocular microbiology

Course Outcomes

On completion of this course, the students will be able to understand microorganisms infecting eye.

Catalog Description

This subject involves study of various microorganisms affecting eye, orbit and its immediate relations, conjunctiva, cornea and sclera. This subject enables in understanding various microorganisms causing eye infection.

Text Books

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, NewDelhi, 1994 MACKIE & McCartney Practical Medical Microbiology

2. Sydney m. Finegold & ellen jo baron: Diagnostic Microbiology (DM)

Course Content

MODULE I

1. Introduction to Microbiology

2 Types of Microorganisms

3 Physiology of Microorganisms – Nutrition, Enzymes, Metabolism and energy, Microbial Growth

MODULE II

1. Control of Microbial Growth – Antimicrobial methods and Chemotherapy

2. Microbes versus Humans- The development of Infection, the disease process, pathogenicity and virulence

MODULE III

1. Ocular Bacteriology - Gram positive,(Staphylococcus aureus, Staphlococcus epidermidis, Streptococcus, propionibacterium, actinomyces, Nocardia) Bacteria including acid fast bacilli (Myobacterium tuberculosis, Myobacterium leprae)

2. Ocular Bacteriology - Gram negative Bacteria (pseudomonas, haemophiilus, Brucella, Neisseria, Moraxella)

MODULE IV

1. Spirochetes (Treponema, Leptospiraceae) 1

2. Virology: Classification of Viruses in Ocular Disease, Rubella,

3. Adenovirus, Oncogenic Viruses (HPV, HBV, EBV, Retroviruses), HIV

4. Fungi : Yeasts, Filamentous, Dimorphic

MODULE V

1. Intracellular parasites - Chlamydia, Protozoa (Taxoplasmosis, Acanthamoeba,)

2. Helminths (Toxocariasis, Filariasis, Onchocerciasis, Trematodes)

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks		
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	**Thinking Abilities**	**Planning Abilities**	**Leadership skills**	**Professional Identity**	**The Optometry and society**	**Environment and sustainability**	**Ethics**	**Individual or team work**	**Communication**	**Modern & Usage**	**Life-long Learning**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT105	OCULAR Microbiology												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 106	COMPUTER FUNDAMENTALS	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with computers and programming Language.

Course Outcomes

Students will learn about basics of computer, programming.

Catalog Description

Text Books

1. William E. Fassett, Computer Application in Pharmacy.
2. Computer Funadamentals by balaguruswami

3. Beckett, A.H., and Stenlake, J.B., Practical Pharmaceutical Chemistry, Vol. I&II. The Atherden Press of the University of London.

4. Alexeyev V. "Quantitative Analysis". CBS Publishers & Distributors.

Reference Books

1. William E. Fassett, Computer Application in Pharmacy.
2. Computer Funadamentals by balaguruswami

Course Content

MODULE I **08**

Definition and Overview of Computer, Computer classification, Computer Organization, Computer code, computer classification of Boolean algebra. Input Devices Output devices, Storage devices. Computer Software, Types of software. Overview of Computer Networks,LAN, MAN, WAN, Internet, Intranet, network topology. Internetworking: Bridges, Repeaters and Routers

MODULE II **08**

Introduction: Operating system and function, Evolution of operating system, Batch, Interactive, Time sharing and Real Time System. Single User Operating System and Multi-user Operating system, Compare MS-DOS vs. UNIX, Various window features. Internal and External commands in MS-DOS

MODULE III **08**

Introduction to MS-OFFICE-2003, word 2003 Document creation, Editing, formatting table handling, mail merge, Excel-2003, Editing, working Retrieval, Important functions, short cut keys used in EXCEL

MODULE IV **08**

MS-Power point 2003-Job Profile, Elements of Power point , ways of delivering Presentation, concept of Four P's (Planning , Preparation, Practice and Presentation) ways of handling presentations e.g. creating, saving slides show controls, Adding formatting, animation and multimedia effects. Database system concepts, Data models schema and instance. Database language, Introduction to MS-Access 2003, main components of Access tables, Queries, Reports, Forms table handling, working on Query and use of database

MODULE V **08**

Computer applications in Optometry and clinical studies, uses of Internet.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

School of Medical and Allied Sciences

Name of The Course	Physical Optics			
Course Code	OPT107			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

1. 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

Course Outcomes

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

CO1	A thorough demonstrative knowledge of properties of light
CO2	To interpret the distribution of light under various conditions
CO3	Demonstrate and explain the various refractive conditions based on the different phenomenon of light
CO4	Explain and demonstrate the knowledge in correcting the refractive errors
CO5	To demonstrate the prediction of light through different types of lenses and mirrors

Text Books

1 Subrahmanyan 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.

Course Content

Unit I: Nature of Light **8 hours** 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.
Unit II: Polarised light **8 hours** 6 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.
Unit III: Interferance **8 hours** 12 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
Unit IV LASER **8 hours** Scattering; Raleigh's scattering; Tyndall effect. 12. Fluorescence and Phosphorescence 2 13. Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein's theory of lasers.
Unit V Radiometry **8 hours** . Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units

School of Medical and Allied Sciences

15. Inverse square law of photometry; Lambert's law. 16. Other units of light measurement; retinal illumination;

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
10	**20**	**70**	**100**

OPT 108	NUTRITION	L	T	P	C
Version	**Date of Approval:**	**3**	**0**	**0**	**3**
Pre-requisites//Exposure					
Co-requisites					

Course 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.**

Course Outcomes

The student will be able to understand 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

Catalog 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

Text Books

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,

4. Elsevier Butterworth – Heinemann, USA, 2006

Course Content

MODULE I

1. Introduction to Nutrition and Food Science, Food Groups and Food Pyramid
2. Balanced diet for different age groups,
3. Assessment of Nutritional Status.

MODULE II

1. Energy – Units, Metabolisms, Energy expenditure, and Energy imbalance..
2. Digestion, absorption and transport of Food

3. Proteins and eye
4. Lipids and eye

MODULE III

1. Carbohydrates and eye.
2. Vitamins and eye
3. Minerals and trace elements and eye

MODULE IV

1. Carotenoids and eye
2. Oxidative stress and the eye

MODULE V

1. Vitamin A, C and E deficiency
2. Nutrition and ocular aging
3. Contraindications, Adverse reactions and ocular nutritional supplements

	Theory	
Components	Internal	SEE
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	**Thinking Abilities**	**Planning Abilities**	**Leadership skills**	**Professional Identity**	**The Optometry and society**	**Environment and sustainability**	**Ethics**	**Individual or team work**	**Communication**	**Modern & Usage**	**Life-long Learning**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT108	NUTRITION												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT 154	OCULAR MICROBIOLOGY PRACTICAL	L	T	P	C
Version	**Date of Approval:**	**0**	**0**	**2**	**1**
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the ocular microbiology

Course Outcomes

On completion of this course, the students will be able to understand practical aspects of microorganisms infecting eye.

Catalog Description

This subject involves study of various microorganisms affecting eye, orbit and its immediate relations, conjunctiva, cornea and sclera. This subject enables in understanding various microorganisms causing eye infection.

Text Books

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, NewDelhi, 1994 MACKIE & McCartney Practical Medical Microbiology

2. SYDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM)

Course Content

Experiments devised to prepare various types of culture media, sub-culturing of common aerobic and anaerobic bacteria, fungus and yeast, various staining methods, various methods of isolation and identification of microbes, sterilization techniques and their validation, validation of sterilization techniques, evaluation of antiseptics and disinfectants, testing the sterility of pharmaceutical products as per I.P. requirements, microbial assay of antibiotics and vitamins.

SUGGESTED PRACTICALS

1. Study of sterilization methods & equipments
• Dry heat
• Moist heat
2. Preparation of various types of culture media.
3. Isolation of bacteria.
4. Sub-culturing of common bacteria, fungi, yeast.
5. Identification and staining of bacteria.
• Simple staining, Gram staining, Acid fast staining, Hanging drop preparation
6. Evaluation of disinfectants and antiseptics

• Phenol coefficient test, minimum inhibitory concentration.
7. Test for sterility of pharmaceutical products as per IP.
8. Microbial assay of antibiotics as per IP.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	**Thinking Abilities**	**Planning Abilities**	**Leadership skills**	**Professional Identity**	**The Optometry and society**	**Environment and sustainability**	**Ethics**	**Individual or team work**	**Communication**	**Modern & Usage**	**Life-long Learning**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT154	OCULAR Microbiology												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

School of Medical and Allied Sciences

Name of The Course	Physical Optics				
Course Code	OPT155				
Prerequisite					
Corequisite					
Antirequisite					
		L	T	P	C
		0	0	2	1

Course Objective:

The objective of the course is to:

1. 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

Course Outcomes

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

CO1	A thorough demonstrative knowledge of properties of light

Text Books

1 Subrahmanyan 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,

List of Experiments

1. Determination of wavelength of light and scattering of light
2. diffraction of light through small circular aperture
3. Verification of malu's law using polarizer and analyzer combination
4. Demonstration of birefringence
5. Measurement of resolving power
6. Various testings for resolving power
7. Demonstration of newtons law
8. Demonstration of flourescence
9. Demonstration of phospholeresence

Continuous Assessment Pattern

Internal Assessment (IA)	End Term Test (ETE)	Total Marks
30	70	100

OPT 156	COMPUTER FUNDAMENTALS Practical	L	T	P	C
Version	Date of Approval:	0	0	4	2
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with computers and programming Language.

Course Outcomes

Students will learn about basics of computer, programming.

Catalog Description

Text Books

1. William E. Fassett, Computer Application in Pharmacy.
2. Computer Funadamentals by balaguruswami

3. Beckett, A.H., and Stenlake, J.B., Practical Pharmaceutical Chemistry, Vol. I&II. The Atherden Press of the University of London.

4. Alexeyev V. "Quantitative Analysis". CBS Publishers & Distributors.

Reference Books

1. William E. Fassett, Computer Application in Pharmacy.
2. Computer Funadamentals by balaguruswami

Course Content

Practical to be conducted

Software Lab to be used for the following:-

1. Windows, Managing Windows, Working with Disk , Folders and files.

2. MS-Office 2003 (MS Word, MS Power point, MS Excel, MS Access).

3. Computer Operating System Like DOS and Windows.

4. Internet Features (E-mail, Browser etc.)

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	**30**	**70**
Total Marks	**100**	

Third Semester

ENGLISH AND COMMUNICATION-I

INSTRUCTOR IN CHARGE Masters in English preferable.

ENG 131	ENGLISH AND COMMUNICATION-I	L	T	P	C
Version	Date of Approval:	2	0	0	2
Pre-requisites//Exposure					
Co-requisites					

COURSE DESCRIPTION: This course deals with essential functional English aspects and nuances of the communication skills essential for the health care professionals.

COURSE OBJECTIVES:

This course trains the students in oral presentations, expository writing, logical organization and structural support.
By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

TEXT BOOK:

Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.

Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications , USA, 2009

REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: Basic English equivalent to 10th standard of the study.

COURSE CONTENT

MODULE I
Basics of Grammar
Vocabulary
Synonyms, Antonyms, Prefix and Suffix, Homonyms Analogies and Portmanteau words

MODULE II
Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms

MODULE III

Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension

MODULE IV
Summary writing, Creative writing, newspaper reading

MODULE V
Formal speech, Phonetics, semantics and pronunciation

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
ENG131	**ENGLISH AND COMMUNICATION-I**												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT181	ENGLISH AND COMMUNICATION-I (PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Third Semester

ENGLISH AND COMMUNICATION-I(PRACTICAL)

INSTRUCTOR IN CHARGE Masters in English preferable.

COURSE DESCRIPTION: This course deals with essential functional English aspects and nuances of the communication skills essential for the health care professionals.

COURSE OBJECTIVES:

This course trains the students in oral presentations, expository writing, logical organization and structural support.

By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

TEXT BOOK:

Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.

Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications , USA, 2009

REFERENCE BOOKS: Faculty may decide.

PREREQUISITES: Basic English equivalent to 10th standard of the study.

COURSE CONTENT

PRACTICAL (Total: 15 hours)

- **Communication process.**
- **Elements of communication**
- **Barriers of communication and how to overcome them.**
- **Nuances for communicating with patients and their attenders in hospitals**

- **Importance of speaking efficiently**
- **Voice culture.**
- **Preparation of speech. Secrets of good delivery**
- **Audience psychology, handling**
- **Presentation skills.**
- **Individual feedback for each student**
- **Conference/Interview technique**

- **Importance of listening**
- **Self-assessment**
- **Action plan execution.**
- **Barriers in listening.**
- **Good and persuasive listening**

- **What is efficient and fast reading**
- **Awareness of existing reading habits**
- **Tested techniques for improving speed**
- **Improving concentration and comprehension through systematic study.**

- **Basics of non-verbal communication**
- **Rapport building skills using neuro-linguistic programming (NLP)**

Mode of Evaluation: **The theory performance of students is evaluated as:**

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT181	ENGLISH AND COMMUNICATION-I(PRACTICAL)												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 201	OCULAR PHARMACY AND PHARMACOLOGY	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the ocular pharmacology, different drugs used in ocular treatment and their mechanism of action.

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of different ocular problems and drugs used to treat them. They will be able analyse occular diseases and mode of action drug used to treat them.

Catalog Description

This is an important subject of optometry. It deals with importance of routes of drug administration as well as has detailed knowledge about different drugs such as Miotics, Mydriatics, Cycloplegics drugs, Antibacterial drugs & therapy and Antifungal drugs & therapy etc.

Text Books

1. Text book of pharmacology by Seth II edition
2. Basic and clinical pharmacology by Katzung IX edition
3. Ocular Pharmacology- Dr. Ashok Garg

Reference Books

1. S P Rang, M M Dale, Ritter- Pharmacology Edition III, Churchill 1995
2. K D Tripathi: Essentials of Medical Pharmacology, IV Edition., 1999
3. Goodman & Gilman's the pharmacological basis of therapeutics, XI edition

Course Content

Module I
Ocular Pharmacology – An introduction, Autonomic nervous system, Routes of drug administration
Module II
Miotics, Mydriatics & Cycloplegics drugs, Antibacterial drugs & therapy, Antifungal drugs & therapy, Anti-Viral drugs & therapy
Module III
Anti-inflammatory drugs & therapy, Anti-glaucoma drugs & therapy, Ophthalmic dyes, Local Anaesthetics
Module IV
Ophthalmic preservatives, Ocular lubricants, Ocular irrigating solutions, Ocular antiseptics & disinfectants
Module V
Anti-cataract agents, Contact lens solution, Chelating agents, Immunosuppressive agents

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70

Total Marks	100

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT201	Ocular Pharmacy and Pharmacology												

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OPT 202	REFRACTION	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the process of refraction including Aphakia/Pseudo-phakia, Presbiopia, Keratoconus and Post-Op. Refractive errors etc.

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of Retinoscopy -Principle & Method, its Objective of Refraction and Subjective of Refraction

Catalog Description

This is an important subject of optometry as it helps to learn about different eye problems due to refraction, clinical visual optics as well as about clinical refraction.

Text Books

1. Ocular Refraction- Dr. AK Khurana
2. Clinical refraction- Borish

Reference Books

1. Bennett & Rabbetts: Clinical visual Optics
2. David O Michaels: Visual Optics & Refraction (DOM)
3. Abrams D: Duke elders Practice of Refraction, Edition 9, 1998
4. Ocular Refraction- Dr. AK Khurana
5. Clinical refraction- Borish

Course Content

Module I
Emmetropia & Ammetropia -Aetiology, Population, Distribution, Growth of eye, Visual Acuity, Myopia
Module II
Hypermetropia, Astigmatism, Aphakia/Pseudo-phakia, Presbiopia, Keratoconus
Module III
A. Post-Op. Refractive errors
B. Refraction of irregular reflex
Module IV
Accommodation & Convergence –1. Far point, near point, ranges. Amplitude of accommodation Accommodation & Convergence – 2. Methods of measurements, NPA. AC/A ratio.
Module V
Retinoscopy -Principle & Method, Objective Refraction, Subjective Refraction

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks		
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT 202	**Refraction**												

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OPT 203	OCULAR DISEASE-ANTERIOR SEGMENT	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the diseases of lid, cornea, schlera, Lachrymal Apparatus, conjuctiva, iris and lens. It will help to learn about symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology , systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology of lid, cornea, schlera, Lachrymal Apparatus, conjuctiva, iris and lens.

Catalog Description

This is an important subject of optometry. It deals with the pathophysiology and pathogenesis of lid, cornea, schlera, Lachrymal Apparatus, conjuctiva, iris and lens. It helps to learn about symptomatology, clinical signs and diagnosis of ocular diseases.

Text Books

1. Ocular Disease- Kanski

Reference Books

1. Essential of Ophthalmology- Dr. Samar K Basak.

2. Ocular Disease- Dr. AK Khurana

Course Content

Module I

Anterior segment ocular diseases involving orbit, eyelids, adnexa, conjunctiva, cornea, urea, sclera, anterior chamber, iris and lens. Symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology , systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures.

Module II

Disease of the Lids – Congenital Deformities of the Lids. Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids. Neoplasm's of the Lids. Injuries of the Lids.

ModuleIII

Diseases of the Lachrymal Apparatus-. Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis

Disease of the Conjunctiva- Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with

Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin-A Deficiency. Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation . Injuries of the Conjunctiva.

Module IV

Disease of the Cornea –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial , Viral , Fungal)

Module V

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

Disease of the Iris.-. Congenital Anomalies. Inflammations (Anterior Uveitis) . Specific Types of Iriodocyclitis . Degenerations of the Iris. Cysts and Tumours of the Iris. Injuries of the Iris.

Module VI

Disease of the Ciliry Body- Inflammations of the Ciliry Body. Purulent Iriodocyclitis (Panophthalmitis). Evisceration. Sympathetic Opthalmia. Vogt- Koyanagi – Harada Syndrome. Tumours of the Ciliry body. Injuries of the Ciliry body.

Module VII

Glaucoma- .Formation of Aqueous Humor. Drainage ofAqueous. Intraocular Pressure(IOP). Ocular Rigidity. Tonography. .Developmental Glaucoma (Buphthalmos) . Primary Narrow Angle Glaucoma. Primary Open Angle Glaucoma. Normotensive Glaucoma. OcularHypertension. Secondary Glaucoma. Surgical Procedures for Glaucoma(Steps Only) , YOGPI, trabeculectomy.Laser Procedure in Glaucoma . Artificial Drainage Devices in Glaucoma Surgery(Molteno).

Module VIII

Disease of the Lens- Congenital Malformations. Cataract . Congenital and Developmental Cataract . Senile Cataract. Traumatic Cataract. Complicated Cataract. Secondary Cataract. After Cataract. Dislocation of the Lens. SurgicalProcedures for Removal of the Lens(Operative Steps Only). Phacoemulsification (ICCE,ECCE,IOL) . Small IncisionCataract Surgery (Manual Phaco).Intraocular Lens Implantation-AC+PC, IOL

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT203	Ocular Disease-Anterior Segment												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT251	OCULAR PHARMACY AND PHARMACOLOGY(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the experiments of Ocular Pharmacy and pharmacology

Course Outcomes

On completion of this course, the students will be able to prepare different kind of eye drops and have knowledge about their uses

Catalog Description

It deals with Quality Control, Sterilization, pH measurement, Osmolarity, Spectrophotometry for concentration and to prepare different eye drops.

Text Books

Reference Book

Course Content

1. Quality Control :
2. Sterilization
3. PH measurement
4. Osmolarity
5. Spectrophotometry for concentration
6. How to prepare following eye drops:
7. Pilocarpin eye drops
8. Artificial eye drops
9. Glycerin eye drops
10. Homatropine eye drops
11. EDTA eye drops
12. Sulphacetamide eye drops
13. Dexamethasone eye drops
14. Methylecellulose eye drops
15. Saline eye drops
16. Sodium citrate eye drops
17. MK Media preparation
18. Fluorescein Strip, Rose Bengal Strips preparation
19. Autologous serum eye drops preparation
20. Dilution of drug in different concentration

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks		
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT251	**Ocular Pharmacy and Pharmacology (Practical)**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT252	REFRACTION (PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To familiarize with the experiments of Refraction.

Course Outcomes

On completion of this course, the students will be able to Record VA, Practice of Streak Retinoscopy, and Direct Opthalmoscopy-Normal Fundus etc.

Catalog Description

It deals with Recording of VA, Practice of Streak Retinoscopy, and Direct Opthalmoscopy-Normal Fundus etc.

Text Books

1. Subrahmanyan N, Brij Lal, 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.

Course Content

1. History writing
2. Recording VA
3. Practice of Streak Retinoscopy
4. Direct Opthalmoscopy-Normal Fundus
5. Subjective refraction – fogging, clockdial, fan, JCC, prism balance, TIB, duochrome, cyclodemia,Slit refraction.
6. Measurement of amplitude of accommodation.
7. Presbyopic add
8. Writing prescription.

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT252	**Refraction (Practical)**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT253	OCULAR DISEASE-ANTERIOR SEGMENT(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To familiarize with the experiments of Refraction.

Course Outcomes

On completion of this course, the students will be able to Record VA, Practice of Streak Retinoscopy, and Direct Opthalmoscopy-Normal Fundus etc.

Catalog Description

It deals with Recording of VA, Practice of Streak Retinoscopy, and Direct Opthalmoscopy-Normal Fundus etc.

Text Books

1. Ocular Disease- Kanski

Reference Books

1. Essential of Ophthalmology- Dr. Samar K Basak.

2. Ocular Disease- Dr. AK Khurana

Course Content

1.Diagnose & treatment methodology of all ocular anterior Segment Diseases

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1		

		Pharmacy Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT253	Ocular Diseaseanterior Segment (Practical)												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

ENG 231	Communicative English -II	L	T	P	C
Version1.01	Date of Approval: Jun 15, 2013	2	0	0	2
Pre-requisites	Communicative English -I				

Course Description

Though, we take students of undergraduate courses to be proficient in English language, we have been proved wrong time and again. The course presented here, is a skill based programme, where we would try to improve all the four skills of the students i.e. LSRW (Listening, Speaking, Reading and Writing). The quest is to improve their understanding and expression so that they are able to do much better in their studies and life as a resultant.

Course Objectives

1 To help the students understand and communicate in English as used in day to day activities.
2. To help the students enhance their competence in the English language.

Course Pre-requisite **Basic understanding of English language/ Diagnostic Test**

Course Outcomes

The students will get the required training in LSRW through the prescribed texts and would be:

1. Able to write simple and meaningful sentences with proper punctuation.
2. Able to understand words, in isolation and in context
3. Able to understand instructions, requests and class lectures.
4. Able to pronounce words correctly in everyday use

Prescribed Texts

1. Murphy Raymond, Essential English Grammar, Cambridge Uni. Press.
2. Intermediate English Grammar. Raymond Murphy ISBN NO 978-81-7596-676-5
3. Essential English Grammar. Raymond Murphy ISBN: 9788175960299
4. **Wallace, Michael J: Study Skills in English, Cambridge University Press, Cambridge, 1980.**

Additional References

1. Bhatnagar, R.P. & R. Bhargava, Law and language, New Delhi: Macmillan.
2. Cross, Ian et al. Skills for lawyers, Jordan Publishing Company., 1997 Bristol.
3. Madabhushi Sridhar, Legal Language, Asia Law House, Hyderabad.
4. Legal Language and Legal Writing – P.K. Mishra

Pedagogy

The course will aim at the facilitation of acquisition of the four basic language skills (listening, speaking, reading and writing) in English language among the heterogeneous set of student base through their active participation in various language skills development related activities.

	Theory		Laboratory		Theory and laboratory
Components	**Internal**	**SEE**	**Internal**	**SEE**	
Marks	**20**	**80**	**20**	**80**	
Total Marks	**100**		**100**		
Scaled Marks	**80**		**20**		**100**

Evaluation Scheme

Description	Weight age (Percentage)
• **Assignment & Quiz (1,2 &3)**	**20%**
• **CAT 1 ***	**15%**
• **CAT 2**	**15%**
• **End Term Exam (3 hours)**	**50%**

***continuous Assessment Test**

Detailed Outlines of the Course

SESSION WISE INSTRUCTION PLAN

Course Name			L	T	P	C
			2	0	0	2
Session No	**Module**	**Topics**	**Core Reading**		**Additional Reference**	
	I	**The Art of Condensation; Reading Comprehension; Introduction to Adjectives; Adverbs, Reported Speech; Word Formation**				
	II	**Constituents of Effective Writing; Modals; Letter Writing (Sales Letter, Cover letter); Resume Writing; Vocabulary (Antonyms, Synonyms, One Word Substitution)**				
	III	**Presentation Techniques; Fundamentals of Report Writing; Essay Writing, E-mail and Telephonic Etiquettes**				

ENG 281	Communicative English -II PRACTICAL	L	T	P	C
Version	**Date of Approval:**	**0**	**0**	**2**	**1**
Pre-requisites//Exposure					
Co-requisites					

Course Description:

Though, we take students of undergraduate courses to be proficient in English language, we have been proved wrong time and again. The course presented here, is a skill based programme, where we would try to improve all the four skills of the students i.e. LSRW (Listening, Speaking, Reading and Writing). The quest is to improve their understanding and expression so that they are able to do much better in their studies and life as a resultant.

Course Objectives:

1. To help the students understand and communicate in English as used in day to day activities.
2. To help the students enhance their competence in the English language.
3.

Course Pre-requisite: Basic understanding of English language/ Diagnostic Test

Course Outcomes:

The students will get the required training in LSRW through the prescribed texts and would be:

5. Able to write simple and meaningful sentences with proper punctuation.
6. Able to understand words, in isolation and in context
7. Able to understand instructions, requests and class lectures.
8. Able to pronounce words correctly in everyday use

Prescribed Texts:

1. Cambridge Grammar for IELTS with answers. ISBN NO 9780521706117
2. Byne: Teaching Writing Skills, Longman, London 1989.
3. Cross, Ian et al. Skills for lawyers, Jordan Publishing Company., 1997 Bristol.
4. Jones Daniel, English Pronouncing Dictionary.

Additional References:

1. **Wallace, Michael J: Study Skills in English, Cambridge University Press, Cambridge,1980.**
2. **Kelkar, Ashok R. "Communication and Style in Legal Language", Indian Bar Review Vol. 10 (3): 1993.**
3. **English Vocabulary in Use. Michael McCarthy & Felicity O'Dell ISBN: 9780521684569**

Pedagogy The course will aim at the facilitation of acquisition of the four basic language skills (listening, speaking, reading and writing) in English language among the heterogeneous set of student base through their active participation in various language skills development related activities.

Evaluation Scheme

	Laboratory		Laboratory
Components	**Internal**	**SEE**	
Marks	**50**	**50**	
Total Marks	**100**		
Scaled Marks	**25**		**25**

***Continuous Assessment Test**

Detailed Outlines of the Course

SESSION WISE INSTRUCTION PLAN

Course Name			**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**
Session No	**Module**	**Topics**	**Core Reading**		**Additional Reference**	
Eng-281		**Basics of Pronunciation: Phonemes, Allophones, Syllables, Stress, Accent, Intonation,' Phonetic Transcription; Group Discussion, Do's and Don'ts of GD; Debate; Role Play; Live Presentations ; Movie Review; Book Review, Newspaper Reading; Mock Lecture; Mock Interview; Skit ; Picture Interpretations; Powerpoint Presentations**				

OPT 204	OPHTHALMIC INSTRUMENTS AND APPLIANCES	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with Opthalmic instruments such as Retinoscope, Indirect Ophthalmoscope, Direct Ophthalmoscope, and Slit Lamp: Haag-Streit., Photo-slit lamp, Lensometer, Tonometer, Fundus Camera etc. It provide detailed knowledge which helps to examine corneal disease.

Course Outcome

On completion of this course, the students will be able to understand- Scope and importance of different opthalmic instruments and appliances, their complete functioning and applications in different diseases.

Catalog Description

This is an important subject of optometry. It deals with the different instruments and their functioning used in the diagnosis and treatment of ocular diseases.

Text Books

1. Michelle Pet Harrin: Instrumentation for Eye care Para professionals,1999.
2. Geoge Smith, David A Atchison: Visual Optical Instruments, 1997.

Reference Books

1. David B Henson: Optometric Instrumentation. (DBH)
2. J. Boyd Eskridge, John F. Amos, Jimmy D. Bartlett: Clinical Procedures in Optometry,1991

Course Content

Module I

Retinoscope, Indirect Ophthalmoscope, Direct Ophthalmoscope, Slit Lamp: Haag-Streit., Photo-slit lamp, Lensometer. Lens gauge

Module II

Tonometer, Fundus Camera, External eye photography, Auto-refractometer

Module III

Corneal Examination- 1.Placido disc 2. Keratometer 3. V KG 4. Specular Microscopy 5. Aesthesiometer

Module IV

Exophthalmometer, Perimeter–Manual & automated, Orthoptics Instruments -Haploscope/Home devices, Heidelberg Retino-tomography HRT -II. Perimeter – Manual & automated, Nerve fiber analyzer, Frequency doubling perimeter, Non Contact Tonometer

Module V

Heidelberg Analmascope, Pachometers, Contrast sensitivity tests, Glare acuity tests, Colour vision tests, Dark adaptometer

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE

Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos												
Sl. No.		**Course Outcomes (COs)**										**Mapped Programme Outcomes**
1												
		Optometry Knowledge	**Thinking Abilities**	**Planning abilities**	**Leadership skills**	**Professional Identity**	**The Pharmacy and society**	**Environment and sustainability**	**Ethics**	**Individual or team work**	**Communication**	**Modern & Usage**	**Life-long Learning**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT204	**Ophthalmic Instruments and Appliances**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT 205	VISUAL OPTICS & LIGHTENING OF THE EYE	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the Visual Optics & Lightening of The Eye. It helps to understand Optical Defects of the Eye, Light sources, Lighting Installation and Recommended level of illuminance etc

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of optical defects of eye, light sources, and Calculations related to Application of inverse square law and Cosine law- Matt surfaces- Lumen method of lighting design – utilization factor and light loss factors.

Catalog Description

This is an important subject of pharmacy. It deals with importance of natural resources- renewable and non renewable, water resources, mineral resources etc. It also deals with different elements ecosystem which is important for sustaining life. This subject also raises the issues like air, water, soil, marine pollution, their causes and measures.

Text Books

1. Borish -Clinical Refraction.
2. Illumination Engineering, J. B. Murdoch

Reference Books

1. Principles & Practice of Refraction, Duke Elder
2. Opthalmic Optics & Refraction (System of Opthalmology-Vol. 5), Duke Elder
3. Visual Optics & Refraction- A clinical approach, David D. Michaels

Course Content

Module I

Review of Geometrical Optics, Schematic and reduced eyes and their properties, Optical constants of the eye and their measurement.Purkinje images. Corneal curvature and thickness. Keratometry and pachometry. Indices of aqueous and vitreous, Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis (angle alpha, Fixation axis (angle gamma), Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power.

Module II

Emmetropia and ametropia, Axial versus spherical ametropia, Myopia Hypermetropia (Hyperopial) Astigmatism. Accommodation- possible mechanism of accommodation-Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude n of accommodation- depth of field, luminance and blur tolerance- amplitude of accommodation versus age. Presbyopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.

Module III

Eye and Vision: Spectroradiometric curve- Vλ-λ curve- photopic and scotopic vision CIE standard observes. Photometric quantities and units- Luminous Flux, Lumen- Illuminance, lux Luminous intensity, Candela –Luminance, Candela/m2. Inverse square law and Cosine law of illumination

(Illuminance) Photometry- Lumer Brodhum photometer, Guild Flickerphotometer- Photocells photo multipliers – photodiodes-noise in physical photometers. Determination lighting of Polar curve of lamps.

Module IV

Light sources- Special energy distribution- luminous efficacy- color rendering properties- Flicker contracts- Daylight, its properties- color lamp – Incandescent.lamps - low pressure Hg-lamps- High pressure Hg-lamps- Low-pressure NA- lamp- High pressure NA-lamps- Typical applications. Lighting Installation- Luminaries their design function up lighting – down lighting mounting position-Choice of lighting equipment- lighting system management.

Module V

Recommended level of illuminance for various including those in optometry and ophthalmology driving etc. VDU- Design of work station – Flicker color contrast- Regulations regarding the use of VDU. Eye Protectors- their constructions standard relating to eye protection, Calculation- Application of inverse square law and Cosine law- Matt surfaces- Lumen method of lighting design – utilization factor, light loss factor, Glare and glare index- disability glarediscomfort glare- control of glare- contrast.

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT206	**Visual Optics & Lightening of The Eye**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT206	OPTHALMIC LENS & DISPENSING OPTICS	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the Opthalmic Lens & Dispensing Optics. It help to understand Characteristics of lenses, Power of lenses, Spectacle lenses, Lens types: Single vision lens. Bi-focal lenses. Tri-focal lenses. Vocational & occupational multifocal progressive lenses as well as Lens for special uses.

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of different kind of lenses their characteristics and uses. It will also help to enhance the knowlege about power of lenses and their special uses. It also deals with Dispensing Optics, Spectacle frame, Frame types, Frame measurements, Frame Selection, Lens Selection.

Catalog Description

This is an important subject of optometry. It deals with importance lenses their types and special uses of these lenses. It also deals with Dispensing Optics, Spectacle frame, Frame types, Frame measurements, Frame Selection, Lens Selection.

Text Books

1. Dispensing Optics-Borish

Reference Books

1. Dispensing Optics-Borish
2. Ocular Disease- Kanski
3. Essential of Ophthalmology- Dr. Samar K Basak.
4. .Ocular Disease- Dr. AK Khurana

Course Content

Module I

Ophthalmic lens: Characteristics of lenses: Introduction. Spherical lenses. Plano-cylindrical lenses. Sphero-cylindrical lenses. Designation of lens power. Power of lenses. Transposition. Write the prescription. Base curve of spherical lens. Base curve of cylindrical single vision lens. Aberration of lens. Prism prescription. Prism effects in a lens. Neutralization. Spectacle lenses: Characteristics of lens materials. Specific gravity (weight). Refractive index. Abbe number. Impact resistance. Scratch resistance. Curve variation factor.

Module II

Current materials: Crownglass. CR-39. High –index glass. High –index plastic. Poly carbonate. Photochromatic materials. Lens types: Single vision lens. Bi-focal lenses. Tri-focal lenses. Vocational & occupational multifocal progressive lenses. Introduction of bi-focal lenses: History of bi-focal lenses. Modern bi-focal designs. Types of bifocal designs. Glass tri-focal lenses. Invisible multi-focal Double segment lens. Plastic bi-focals.

Module III

Opthalmic lens coating: Anti-reflecting coatings. Special notes concerning anti-reflecting coatings. Protective coating, color coating. Absorptive lenses: Classification of lens tints. Chemical that produces

color & assist in absorptive characteristics of glass lenses. Effect in prescription on lens color. Availability of tinted lenses. Impact resistant lenses: Types of impact resistant lenses. Plastic lenses. Impact resistant Dress-Eye wear lenses. Tempered glass lenses. Types of impact resistant lenses most beneficial of specific patients.

Module IV

Lens for special uses: Fresnel lenses Thinlite lenses Lenses for the Aphakic patient. Aspheric lenses. Lens surfacing & quality. Principles of lens surface generation. Glass assessment. Faults in lens materials & lens surface. Inspection of lens quality.

Module V

Dispensing Optics: Spectacle frame: Current frame materials- a) Plastics b) Metals, Frame types: Combination of frames-Half-eye frames, Mounts, Nylon-cord frame, Special purpose frames, Frame measurements: The boxing system, The datum system, Comparison of the two systems, Lens position, Segment specification, Frame Selection: Fashion, Function,Feel, Conflicting needs, Price, Standard alignment. Lens Selection: Ground rule for selection, Selection criteria, Facial Measurement, The PD, Visual axes, Measuring inter papillary distance using PD ruler, Common difficulties in measuring PDs, Measuring monocular PD, Measuring near PD

Module VI

Measuring heights: Single vision, Multi focal, bi-focal, Progressive, Pediatric Dispensing: The changing image of spectacle, Age differences. Frame SelectionTechnical Criteria, Fashion criteria, some tips on selection. Lens Selection Technical criteria-Communicating with kids, kids corner, Facial measurement of the kids-PDs, Centers, Bi-focals, Dealing with problems: Dealing with clients, Common client problems, dealing with professional colleagues, Dealing with the laboratories. Special needs dispensing: Occupational dispensing, Hazards in the work place, Occupational health safety legislation, Common hazards. Eye protection: Industrial eye protection, Sport, Standards covering eye protection, Lens materials & impact resistance, Frame & eye protection.

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT206	Opthalmic Lens & Dispensing Optics												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT207	Binocular Vision -I	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

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

• Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extroocular muscles.

• Provide a detailed explanation of, and differentiate between the aetiology, investigation and management of binocular vision anomalies.

• Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

Course Outcomes

On completion of this course, the students will be able to understand- Scope and importance of binocular vision; it helps to enhance the knowlegde and capabilty to serve society regarding eye problems.

Catalog 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 extrocular muscles, various binocular vision anomalies, its diagnostic approaches and management.

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

Reference Books

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

Course Content

Module I

Binocular Vision and Space perception, ¾ Relative subjective visual direction. ¾ Retino motor value, ¾ Grades of BSV, ¾ SMP and Cyclopean Eye, ¾Correspondence, ¾ Fusion, Diplopia, Retinal rivalry, ¾Horopter, ¾ Physiological Diplopia and Suppression, ¾ Stereopsis, Panum's area, BSV. ¾ Stereopsis and monocular clues - significance. ¾ Egocentric location, clinical applications. ¾ Theories of Binocular vision.

Module II

Anatomy of Extra Ocular Muscles. ¾ Rectii and Obliques, LPS. ¾ Innervation & Blood Supply. Physiology of Ocular movements. ¾ Center of rotation, Axes of Fick. ¾ Action of individual muscle. Laws of ocular motility, ¾ Donder's and Listing's law, ¾Sherrington's law, ¾Hering's law, Uniocular & Binocular movements - fixation, saccadic & pursuits. ¾ Version & Vergence.

¾ Fixation & field of fixation.

Module III

Near Vision Complex, Accommodation, ¾ Definition and mechanism (process). ¾ Methods of measurement. ¾ Stimulus and innervation. ¾ Types of accommodation. ¾ Anomalies of accommodation – aetiology and management. Convergence, ¾ Definition and mechanism. ¾ Methods of measurement. ¾

Types and components of convergence - Tonic, accommodative, fusional, proximal. ¾ Anomalies of Convergence – aetiology and management.

Module IV

Sensory adaptations Confusion, Suppression Investigations, Management Blind spot syndrome

Module V

Abnormal Retinal Correspondence, Investigation and management, Blind spot syndrome, Eccentric Fixation, Investigation and management, Amblyopia Classification, Aeitiology Investigation Management

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Optometry Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Pharmacy and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT207	**Binocular Vision -I**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT254	OPHTHALMIC INSTRUMENTS AND APPLIANCES(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To familiarize with the experiments of Ophthalmic Instruments And Appliances

Course Outcomes

On completion of this course, the students will be able to deal with Lensometer, Lens gauge, Tonometer, Placido disc, Keterometer, VKG, Specular Microscopy

Catalog Description

It deals with with Lensometer, Lens gauge, Tonometer, Placido disc, Keterometer, VKG, Specular Microscopy etc.

Text Books

1. Dispensing Optics-Borish

Reference Books

1. Dispensing Optics-Borish
2. Ocular Disease- Kanski
3. Essential of Ophthalmology- Dr. Samar K Basak.
4. .Ocular Disease- Dr. AK Khurana

Course Content

1. Lensometer, Lens gauge
2. Tonometer
3. Placido disc
4. Keterometer
5. VKG
6. Specular Microscopy
7. Exophthalmometer
8. Perimeter
9. Non Contact Tonometer
10. Slit Lamp: Haag-Streit.
11. Photo-slit lamp
12. Fundus Camera
13. Contrast sensitivity tests
14. Glare acuity tests
15. Colour vision tests
16. Dark adaptometer

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Pharmacy Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT254	**Ophthalmic Instruments And Appliances (Practical)**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT255	Visual Optics & Lighting of the Eye(Practical)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with Visual Optics & Lighting of the Eye (Lab).

Course Outcomes

On completion of this course, the students will be able to understand- Visual Optics & Lighting of the Eye (Lab)

Catalog Description

This is an important subject of optometry. It deals with physical photometer, Correction of myopia-spectacle refraction.

Text Books

1. Borish -Clinical Refraction.

2. Illumination Engineering, J. B. Murdoch

Reference Books

1. Principles & Practice of Refraction, Duke Elder

2. Opthalmic Optics & Refraction (System of Opthalmology-Vol. 5), Duke Elder

3. Visual Optics & Refraction- A clinical approach, David D. Michaels

Course Content

Visual optics helps in Diagnoses & treatment methodology of all ocular disease and lightening of eye.

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1		

		Pharmacy Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT255	Visual Optics & Lighting of the Eye (Practical)												

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OPT256	OPHTHALMIC LENS & DISPENSING OPTICS (PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

The basic objective of this course is to get familiar with the ophthalmic lens and dispensing optics.

Course Outcomes

On completion of this course, the students will be able to understand- meridian & optical center of ophthalmic lens, Neutralization – manual & help of lensometer, Identification of lens-spherical, cylindrical & sphero-cylindrical lenses.

Catalog Description

This is an important subject of optometry. It deals with Lens-surfacing & edging, cutting & marking of single vision bifocal progressive, Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification, Frame selection: Fashion, function & standard alignment, Lens selection: Ground rule for selection, selection criteria, Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler.

Text Books

1. Dispensing Optics-Borish

Reference Books

1. Dispensing Optics-Borish
2. Ocular Disease- Kanski
3. Essential of Ophthalmology- Dr. Samar K Basak.
4. .Ocular Disease- Dr. AK Khurana

Course Content

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

Mode of Evaluation: The theory performance of students is evaluated as:

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**
1		

		Pharmacy Knowledge	Thinking Abilities	Planning abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT256	**OPHTHALMIC LENS & DISPENSING OPTICS (PRACTICAL)**												

1=Addressed to small extent

2=Addressed significantly

3=Major part of course

OPT 301	BINOCULAR VISION II	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the binocular vision and ocular motility.

Course Outcomes

On completion of this course, the students will be able to understand Grades of binocular vision, Depth perception, Binocular Vision Test.

Catalog Description

This subject involves study of binocular vision, Binocular fusion, Dihoptic stimulation, Binocular optical defects, Binocular muscular anomalies. It also deals with the test for simultaneous macular perception, test for fusion, test for stereopsis, and diagnosis & clinical aspects of ocular anomalies & disorders.

Text Books

1. *Anatomy & Physiology- Dr. AK Kurana*

2. Handbook of Pediatric Strabismus Amblyopia- Dr. Kenneth right

Reference Books

1. *Anatomy & Physiology- Dr. AK Kurana*

2. Handbook of Pediatric Strabismus Amblyopia- Dr. Kenneth right

Course Content

MODULE I: Grades of binocular vision-simultaneous perception (first grade of binocular vision), fusion, steropsis (third grade of binocular single vision). Advantages of binocular vision. Visual direction and the horopter visual direction, corresponding point and normal retinal correspondence, horopter, physiologic diplopia. Binocular fusion-panum's area, fixation disparity, theories of binocular fusion,synergy hypothesis of panum, local sign hypothesis of hering, eye movement hypothesis of helmholts, suppession hypothesis of du tour and verhoeff, physiologic basis of fusion. Dihoptic stimulation-depth with fusion and depth with diplopia, diplopiawithout depth, retinal rivary and suppretion,binocular lusure. Stropsis-physiologicalbasis of stereopsis,local and global stereopsis and fusion,stereopsis acuity neurophysiology of stereopsis.

MODULE II: Depth perception-steropsis, nonstereoscopic clues to the perception of depth under binocular condition,monocular clues (non stereoscopic clues to spetial orientation)-parallactic movements, linear perspective over view of contours, size distance from horizon ,distribution of highlights, shadow, shades and light , aerial perspective influence of accommodation and convergence on depth perception, conclusion, Integration of the motor and sensory system into binocular vision. Binocular defects: Binocular optical defects-anisometropia-vision in anisometropia, treatment, Binocular optical defects-aniseikonia- symtoms, clinical investigatoin, treatment. Binocular muscular co-ordination-orthophoria-binocular vision.

MODULE-III: Binocular muscular anomalies-heterophoria-the causes of imbalance, exophoria, esophoria, hyperphoria, cyclophoria, symptoms of heterophoria, treatment. Binocular muscular anomalis-heterotropia- the vision in concomitant strabismus, treatment, Binocular muscular co-ordination-convergence-voluntary and reflex convergence, reflex convergence, the measurement of

convergence, the relation between accommodation andconvergence, binocular accommodation, fatigue of convergence. Binocular muscular anomalies-anomalies of convergence and other reading difficulties—insufficiency of convergence, convergence excess, the ophthalmologist and the reading ability of children.

MODULE-IV: Binocular Vision Test Test for simultaneous macular perception, test for fusion, test for stereopsis- synoptophore or stereoscope test, vectograph test, titmus stereo test, randomdot sterogram test, simple motor task test based on stereopsis. Diagnosis & clinical aspects of ocular anomalies & disorders, Converge through a spectacle lens, prismatic effects in spectacle lenses.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT301	**BINOCULAR VISION II**												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

Course Content

1. Orthoptic-General concept
2. AC/ A ratio.
3. Measurements of angle of squint
4. Latent squint
5. Maddox rod
6. Maddox wing
7. Synaptophore
8. Manifest concomitant
9. Squint concomitant
10. Paralytic Squint
11. Head posture and its significance
12. Hess Screening and its Interpretations
13. Pleoptics
14. Occlusion -types and uses
15. Nystagmus
16. V. Syndromes
17. Testing of ARC
18. Amblyopia
19. Disorders of accommodation
20. Paediatric visual acuity assessment
21. Paediatric Refraction
22. Neural aspects of binocular vision Ocular muscles and movements

OPT302	CONTACT LENS-I	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the preliminary investigations, optics, instrumentation and characteristics of contact lens.

Course Outcomes

On completion of this course, the students will be able to understand history of Contact Lens, Corneal Anatomy and Physiology, Corneal Physiology and Contact Lens, Preliminary Measurements and Investigations, Slit Lamp Biomicroscopy, Contact Lens materials.

Catalog Description

This subject deals with Glossary of Terms: Contact Lenses, Indications and Contra Indications Contact Lens, Rigid gas permeable contact lens design, Fitting philosophies, Fitting of Spherical SCL and effect of parameter changes, Astigmatism correction options, Fitting Spherical RGP contact Lenses, Low OK, High OK, Effects of RGP contact Lens parameter changes on lens fitting Fitting in Astigmatism (Sph RGP), Instrumentation in contact lens practice, Checking finished lenses parameters, Recent developments in Contact lenses and review of lenses available in India .

Text Books

1. Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3rd Edition, 1981, Illinois, USA

2. Ruben M Guillon: Contact lens practice, 994, I ,Edition

Reference Books

1. IACLE for Contact Lens
2. Ruben M Guillon: Contact lens practice, 994, I ,Edition

Course Content

1. History of Contact Lens
2. Corneal Anatomy and Physiology
3. Corneal Physiology and Contact Lens
4. Preliminary Measurements and Investigations
5. Slit Lamp Biomicroscopy
6. Contact Lens materials
7. Optics of the Contact Lens
8. Glossary of Terms: Contact Lenses
9. Indications and Contra Indications Contact Lens
10. Rigid gas permeable contact lens design
11. Soft Contact lens design & manufacture
12. Kertometery, Placido's disc, Tonography
13. Fitting philosophies
14. Fitting of Spherical SCL and effect of parameter changes
15. Astigmatism correction options
16. Fitting Spherical RGP contact Lenses, Low OK, High OK
17. Effects of RGP contact Lens parameter changes on lens fitting
18. Fitting in Astigmatism (Sph RGP)
19. Follow-up post fitting examination

20. Follow-up Slit Lamp examination
21. Fitting in Keratoconus
22. Fitting in Aphakia, Pseudophakia
23. Cosmetic Contact Lenses
24. Fitting Contact Lens in children
25. Toric Contact Lenses
26. Bifocal Contact Lenses
27. Continuous wear and extended wear lenses
28. Therapeutic Lenses/Bandage lenses
29. Contact lens following ocular surgeries
30. Disposable contact lenses, frequent replacement and Lenses
31. Use of Specular Microscopy and Pachymetry in Contact Lenses
32. Care & maintenance of Contact Lenses
33. Contact Lens modification of finished lenses
34. Instrumentation in contact lens practise
35. Checking finished lenses parameters
36. Recent developments in Contact lenses
37. Scleral Contact lenses
38. Corneal Topography
39. Contact lens in Sports Vision
40. Review of lenses available in India

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT302	CONTACT LENS-I												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT 303	LOW VISION AIDS & VISUAL REHABILITATION	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basics of low vision aids and visual rehabilitation.

Course Outcomes

On completion of this course, the students will be able to understand definition, grades, statistics of low Vision, Low vision optics, examination and refraction.

Catalog Description

This subject deals with magnification-relative distance/ relative size/ approach/angular Optics of Galilian & Keplarian telescope, Assessment & prescription of low vision devices-optical/ non-optical/ rehabilitation services,Non- optical devices-pen/umbrella/ boldline note book/ illumination/ letter writer/environmental modification/ signature guide/ needlethreader/ eccentric viewing strategies. It also deals with overview of systematic / retinal diseases in relation to low vision, Acromatopsia, and counseling of low vision patient.

Text Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Reference Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Course Content

MODULE I: Low Vision: Definition, Grades of low vision, Statistics/ Epidemiology, Relation between disorder, impairment & handicapped,

MODULE II: Low vision optics: Magnification-relative distance/ relative size/ approach/angular Optics of Galilian & Keplarian telescope- advantage/disadvantage, significance of exit & entrance pupil,Optics of spectacle magnifier/ determination/ calculation/ disadvantage/advantage. Optics of stand magnifier, significance of equivalent viewing distance & calculations, Telescope- distance/ near/ telemicroscope/ monocular/ binocular/ bioptic, Determination of decentration of lenses /prism/calculation/ Lebenson's formula/simple diotric, formula. Hand held magnifier-illuminated/ non-illuminated, Spectacle magnifier / half eye/ prism correction/ bar magnifier/ CCTV/ magni-cam/ low vision imaging system or V-max / contact lens & IOL telescope.

MODULE III: Low vision examination: Task/ Goal oriented history-medical/ visual/ psychological history/ task analysis/ mobility/ distance vision/ near vision / daily living/ illumination/ work & school.Visual acuity measurement-distance/ near/ use of log MAR chart (distance & near)/ light house, picture chart/ visual field/ Amsler chart/ contrast sensitivity/ overview of glare testing.

MODULE IV: Low vision refraction, Assessment & prescription of low vision devices-optical/ non-optical/ rehabilitation services,Non- optical devices-pen/umbrella/ boldline note book/ illumination/ letter writer/environmental modification/ signature guide/ needlethreader/ eccentric viewing strategies, Overview of Rehabilitation Services:- definition/ implementation/ vocational guidance/educational guidance/ mobility & orientation training / special teacher/ special school/ Braille system/ integrated system/referral center- activity/ support/ loan. Overview of systematic / retinal diseases in relation to low vision ,Acromatopsia/ LMBB: syndrome/ labers congenital anomaly/ down syndrome/retinitis pigmentosa/ diabetic retinopathy/ optic atrophy/ albinism/ aniridia. Counseling of low vision patient/ parents/ guardians/relatives.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT303	**LOW VISION AIDS & VISUAL REHABILITATION**												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT 304	PATHOLOGY	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

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

- **Inflammation and repair aspects.**
- **Pathology of various eye parts and adnexa**

Course Outcomes

On completion of this course, the students will be able to understand Ocular pathology.

Catalog Description

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

Text Books

1. 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, newDelhi, 2004.*
2. *S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.*

Course Content

1 General Pathology : Principles
2 Pathophysiology of Ocular Angiogenesis
3 Ocular Infections
4 Pathology of cornea and Conjunctiva
4 Pathology of Uvea
5 Pathology of Glaucoma
6 Pathology of Retina
7 Pathology of retina in systemic disease/disorders
8 Pathology of eyelids and adnexa
9 Pathology of orbital space occupying lesions
10 Pathology of the optic nerve
11 Retinoblastoma
12 Pathology of Lens

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT304	PATHOLOGY												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 351	BINOCULAR VISION II(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basic of clinical and advanced orthoptics.

Course Outcomes

On completion of this course, the students will be able to understand manifest squint work-up And Paralytic squint work-up.

Catalog Description

This subject deals with squint work-up, pleoptics and orthoptic exercises.

Text Books

1. Jerome Rosner: Pediatric Optometry, Butterworths, London, 1982

2. Hirsch M J & Wick R E: Vision of the Aging Patient, An Optometric Symposium, 1960

Reference Books

1. Feona J Rove: Clinical Orthoptics, III Edition. ,2012

2. David Stidwill: Orthoptic Assessment and Management,1998

3. Dr. Kenneth right Handbook of Pediatric Strabismus Amblyopia,

Course Content

1. Manifest squint work-up
2. Paralytic squint work-up
3. Pleoptics
4. Orthoptic Exercises

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT351	BINOCULAR VISION II (PRACTICAL)												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT352	CONTACT LENS-I(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basics of contact lens.

Course Outcomes

On completion of this course, the students will be able to understand Contact Lens fitting and Counseling to Contact Lens patient.

Catalog Description

This subject deals with contact Lens fitting, Counseling to Contact Lens patient, Post-fitting instructions, Remedy of post-fitting problems.

Text Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Reference Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Course Content

1. Contact Lens fitting
2. Counseling to Contact Lens patient
3. Post-fitting instructions
4. Remedy of post-fitting problems.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT352	CONTACT LENS-I (PRACTICAL)												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT 353	LOW VISUAL AIDS & REHABILITATION (PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course

Objectives

To understand the basics of low visual aids and rehabilitation.

Course Outcomes

On completion of this course, the students will be able to understand application of devices, Rehabilitation of low visual aids.

Catalog Description

On completion of this course, the students will be able to understand Case history, Assessment, Application of devices, Rehabilitation.

Text Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Reference Books

1. *The Art & Practice of Low Vision, By Freeman & Jose, Butterwort Pub.*
2. *Understanding Low Vision , AFB Publication*
3. *Essential of Low Vision Practise- Richard Brilliant*

Course Content

1. Case history.
2. Assessment.
3. Application of devices.
4. Rehabilitation.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT353	LOW VISUAL AIDS & REHABILITATION (PRACTICAL)												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OVT305	Vision Technician-I (Lab)	L	T	P	C
Version 1.0	Date of Approval: 11 – 01 – 2016	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

This program is aimed at training candidates for the job of a "Vision Technician", in the "Healthcare" Sector/Industry and aims at building the following key competencies amongst the learner

Course Outcomes

• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.
• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.
• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.
• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.
• Demonstrate bio medical waste management.
• Practice infection control measures.
• Demonstrate safe practices to use equipment's required in their role.
• Demonstrate safe handling and storing of documents, record maintenance etc.
• Demonstrate techniques to maintain the personal hygiene needs
• Demonstrate professional behavior, personal qualities and characteristics of a Vision Technician
• Demonstrate good communication and team worker ability in the role of Vision Technician

Reference Books

1.AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

3.Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002

4.M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002

5.HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.

6.H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.

7.WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri,

USA,2006

8.T Grosvenor: Primary Care Optometry,4th edition, Butterworth –heinneman,USA,2002

9. David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

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

COURSE CONTENT

Module I

Introduction**:**

To Healthcare Systems & Ophthalmology Services: Basic Understanding of Healthcare Service Providers (primary, secondary & tertiary) Hospital Functions , Ophthalmology Department &it's facilities & services to patients

Role Of VisionTechnician**:**

• To develop broad understanding of the functions to be performed by Vision Technician
• Develop understanding to perform test for visual acuity, patient position and rightly assessing refractive status
• To determine the patient's visual needs
• To maintain, manage, calibration of instruments used in ophthalmology department or eye care facility
• To assist the physician/Ophthalmologist during eye examination and procedure/ treatment
• To Identify any cultural and special needs that may influence performance of test
• To develop Understanding of Patient Comfort and Safety
• To exhibit ethical behavior and understanding of administrative functions

Ocular Anatomy & Physiology**:**

Understanding different parts of eye and their functions
• To develop an understanding regarding physiology of the eye, visual system, control of eye movements,
streaming of visual information
• To understand the functions of different part of eye

Module 2

Introduction To Ophthalmology Related Medical Terminology:

Understand appropriate use of Ophthalmology related medical terminology in daily activities with colleagues, patients and family

Common Eye Disease:

To gain broad understanding regarding common eye

Personnel Hygiene Of Vision Technician:

To develop understanding of the concept of Healthy Living
• To develop understanding & procedures of Hand Hygiene
• To develop techniques of Grooming
• To be equipped with Techniques of Use of PPE
• To be vaccinated against common infectious diseases of eye diseases

Module 3

Sanitation ,Safety & First Aid:

To develop understanding and precautions to maintain hygiene and safety

- **Describe common emergency conditions and what to do in medical emergencies**
- **Describe basics of first aid**
- **To be able to identify ophthalmic emergencies**
- **To be able to clean, disinfect, and sterilize contact lenses.**
- **To develop understanding and precautions to ensure self-safety**

Bio Medical Waste Management:

To gain understanding of importance of proper and safe disposal of bio-medical waste & treatment

To gain understanding of categories of bio-medical waste

- **To learn about disposal of bio-medical waste – colour coding, types of containers, transportation of waste,etc.**
- **To gain broad understanding of standards for biomedical waste disposal**
- **To gain broad understanding of means of bio-medical waste treatment**

Module 4

Soft Skills & Communication– I:

Understand art of effective communication and be able to respond to queries and information needed

• Able to handle effective Communication with Patients & Family

• Able to handle effective Communication with Peers/colleagues using medical terminology in communication

• Able to maintain confidentiality and respecting need for privacy

Measurement of Vitals:

To be able to measure vital parameters like Pulse, BP, Temperature, Respiration, Height and Weight of patient

• To be able to raise alarm in case of deviation of vital parameters from normaldiseases

Module 5

History Taking:

To be well acquainted with clinical notes writing , assessment forms and formats as per HCO policies

• To develop broad understanding regarding obtaining and recording the history of patient

Patient Positioning For Procedure:

To develop understanding of providing comfortable position for a patient

• To develop broad understanding of position and alignment of patient at the correct distance from the test chart

Mode of Evaluation: The theory performance of students is evaluated as

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1.	**• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.** **• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.** **• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.**	1,2,3,4,5,6,7,8,9,10

	• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.	

		Optometry Knowledge	**Thinking Abilities**	**Planning Abilities**	**Leadership skills**	**Professional Identity**	**The Optometry and society**	**Environment and sustainability**	**Ethics**	**Individual or team work**	**Communication**	**Modern & Usage**	**Life-long Learning**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPTHSS-I P	Vision Technician-I (Lab)	**2**	**2**	**2**	**2**	**1**	**3**	**1**	**2**	**2**	**2**		

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OVT354		L	T	P	C
Version 1.0	Date of Approval: 11 – 01 – 2016	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

This program is aimed at training candidates for the job of a "Vision Technician", in the "Healthcare" Sector/Industry and aims at building the following key competencies amongst the learner

Course Outcomes

• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.
• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.
• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.
• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.
• Demonstrate bio medical waste management.
• Practice infection control measures.
• Demonstrate safe practices to use equipment's required in their role.
• Demonstrate safe handling and storing of documents, record maintenance etc.
• Demonstrate techniques to maintain the personal hygiene needs
• Demonstrate professional behavior, personal qualities and characteristics of a Vision Technician
• Demonstrate good communication and team worker ability in the role of Vision Technician

Reference Books

1.AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

3.Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002

4.M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002

5.HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.

6.H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.

7.WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri,

USA,2006

8.T Grosvenor: Primary Care Optometry,4th edition, Butterworth –heinneman,USA,2002

9. David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

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

COURSE CONTENT

Module I

Introduction**:**

To Healthcare Systems & Ophthalmology Services: Basic Understanding of Healthcare Service Providers (primary, secondary & tertiary) Hospital Functions , Ophthalmology Department &it's facilities & services to patients

Role Of VisionTechnician**:**

• To develop broad understanding of the functions to be performed by Vision Technician
• Develop understanding to perform test for visual acuity, patient position and rightly assessing refractive status
• To determine the patient's visual needs
• To maintain, manage, calibration of instruments used in ophthalmology department or eye care facility
• To assist the physician/Ophthalmologist during eye examination and procedure/ treatment
• To Identify any cultural and special needs that may influence performance of test
• To develop Understanding of Patient Comfort and Safety
• To exhibit ethical behavior and understanding of administrative functions

Ocular Anatomy & Physiology**:**

Understanding different parts of eye and their functions
• To develop an understanding regarding physiology of the eye, visual system, control of eye movements,
streaming of visual information
• To understand the functions of different part of eye

Module 2

Introduction To Ophthalmology Related Medical Terminology:

Understand appropriate use of Ophthalmology related medical terminology in daily activities with colleagues, patients and family

Common Eye Disease:

To gain broad understanding regarding common eye

Personnel Hygiene Of Vision Technician:

To develop understanding of the concept of Healthy Living
• To develop understanding & procedures of Hand Hygiene
• To develop techniques of Grooming
• To be equipped with Techniques of Use of PPE

• To be vaccinated against common infectious diseases of eye diseases

Module 3

Sanitation ,Safety & First Aid:

To develop understanding and precautions to maintain hygiene and safety

• Describe common emergency conditions and what to do in medical emergencies

• Describe basics of first aid

• To be able to identify ophthalmic emergencies

• To be able to clean, disinfect, and sterilize contact lenses.

• To develop understanding and precautions to ensure self-safety

Bio Medical Waste Management:

To gain understanding of importance of proper and safe disposal of bio-medical waste & treatment

To gain understanding of categories of bio-medical waste

• To learn about disposal of bio-medical waste – colour coding, types of containers, transportation of waste,etc.

• To gain broad understanding of standards for biomedical waste disposal

• To gain broad understanding of means of bio-medical waste treatment

Module 4

Soft Skills & Communication– I:

Understand art of effective communication and be able to respond to queries and information needed

• Able to handle effective Communication with Patients & Family

• Able to handle effective Communication with Peers/colleagues using medical terminology in communication

• Able to maintain confidentiality and respecting need for privacy

Measurement of Vitals:

To be able to measure vital parameters like Pulse, BP, Temperature, Respiration, Height and Weight of patient

• To be able to raise alarm in case of deviation of vital parameters from normaldiseases

Module 5

History Taking:

To be well acquainted with clinical notes writing , assessment forms and formats as per HCO policies

• To develop broad understanding regarding obtaining and recording the history of patient

Patient Positioning For Procedure:

To develop understanding of providing comfortable position for a patient

• To develop broad understanding of position and alignment of patient at the correct distance from the test chart

Mode of Evaluation: The theory performance of students is evaluated as

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1.	**• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.** **• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.** **• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.**	1,2,3,4,5,6,7,8,9,10

	• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.	

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OPT 305	SYSTEMIC CONDITION & THE EYE(POSTERIOR SEGMENT DISEASE)	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basic of systemic condition and eye.

Course Outcomes

On completion of this course, the students will be able to understand Pathophysiology, classification, clinical examination, diagnosis of diseases like Arterial Hypertension, Diabetes mellitus, Tropical Disease and the Eye: Leprosy, Syphilis, Malaria, Neurological disease and the eye.

Catalog Description

This subject deals with the pathophysiology of hypertension, diabetes, Acquired Heart Disease, Connective Tissue Disease, Thyroid Disease, Tuberculosis, Vitamin deficiency and the eye, Visual pathway lesions, Papilloedema, Genetic disorders and the eye, Phacomatoses & the eye.

Text Books

1. *Clinical Ophthalmology – Jack J. Kanski*

Reference Books

1. Clinical Ophthalmology – Jack J. Kanski

Course Content

1. Arterial Hypertension: Pathophysiology, classification, clinical examination, diagnosis, complications, management, Hypertension and the eye.

2. Diabetes mellitus: Pathophysiology, classification, clinical features, diagnosis, complications, management, Diabetes mellitus and the eye.

3. Acquired Heart Disease – Embolism, Rheumatic heart disease, Sub acute bacterial endocarditic.
Heart disease & the eye.

4. Malignancy: Definitions, nomenclature, characteristics of benign & malignant neoplasms. Grading and staging of cancer, diagnosis, priniples of treatment. Neoplasia and the eye.

5. Connective Tissue Disease: Anatomy and path physiology: Arthritis.

6. Thyroid Disease: Anatomy and physiology of the thyroid gland, Classification of thyroid disease, Diagnosis, complications, clinical features, management of thyroid disease involving eye.

7. Tuberculosis: Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye.

8. Tropical Disease and the Eye: Leprosy, Syphilis. Malaria.

9. Vitamin deficiency and the eye

10. Neurological disease and the eye: Classification of neurological diseases, Demyelinating diseases

11. Visual pathway lesions

12. Papilloedema.

13. Genetic disorders and the eye.

14. Phacomatoses & the eye.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT305	**SYSTEMIC CONDITION & THE EYE(POSTERIOR SEGMENT DISEASE)**												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT306	GERIATRIC & PEDIATRIC OPTOMETRY	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basics of geriatric and pediatric optometry.

Course Outcomes

On completion of this course, the students will be able to understand Vision & Paediatric evaluation, diagnosis & management.

Catalog Description

This subject deals with Strabismus & Amblyopia, Non- Strabismus Binocular Disorders, Neuro- Optometric Rehabilitation, Evaluation, Diagnosis & Optometric management of children with mental retardation C.P. Dyslexia, . Refraction in special cases (pseudophakia , aphakia, irregular corneal astigmatism , coloboma of iris. It also deals with choroids, Retina, Nystagmus, Post R.K., PRK, LASIK), Congenital cataract, glaucoma, Patient with low vision, Patient with anisometropia (Anisokonia), Monocular & binocular subjective refraction.

Text Books

1. Paediatric Optometry, By Jerome Rosner
2. Vision development, By ILG & Bullis
3. Management of Special Population, By Dominiquee Maino

Reference Books

1. Paediatric Optometry, By Jerome Rosner
2. Vision development, By ILG & Bullis
3. Management of Special Population, By Dominiquee Maino

Course Content

1. Assessment of children Vision & Paediatric evaluation, diagnosis & management.
2. Strabismus & Amblyopia
3. Non- Strabismus Binocular Disorders.
4. Neuro- Optometric Rehabilitation.
5. Evaluation, Diagnosis & Optometric management of children with mental retardation C.P. Dyslexia,
6. Multiple Sensory Motor Handicap.
7. Visual Disorders in senior citizens, evaluation, diagnosis+ management.
8. Sports vision.
9. Refraction in special cases (pseudophakia , aphakia, irregular corneal astigmatism , coloboma of iris,
10. Choroids, Retina, Nystagmus, Post R.K., PRK, LASIK)
11. Congenital cataract, glaucoma.
12. Patient with low vision.
13. Patient with anisometropia(Anisokonia)
14. Monocular & binocular subjective refraction.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT306	GERIATRIC & PEDIATRIC OPTOMETRY												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT 307	CONTACT LENS-II	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basic of occupational optometry.

Course Outcomes

On completion of this course, the students will be able to understand Occupational health, hygiene and safety, International bodies- International Labor Organization(ILO), World Health Organization(WHO), National bodies , Occupational diseases.

Catalog Description

This subject involves study of Occupational health, Acts and Rules - Factories Act, Workman's Compensation Act, Employee State Insurance Act Effect of physical, Chemical & other hazards on Eye & Vision, Occupational diseases - caused by physical agents, chemical agents and Visual Display Units – Visual Display Unit & Visual Display Terminal, Sports terminologies & Sports Vision Examination Personal protective equipments - General, eye - selection, use and testing for Standards.

Text Books

1. Eye Essentials- Environmental and Occupational Optometry, by Gordon Carson

Reference Books

1. *Eye Essentials- Environmental and Occupational Optometry, by Gordon Carson*

Course Content

MODULE 1: Introduction to Occupational health, hygiene and safety, International bodies- International Labor Organization(ILO), World Health Organization(WHO), National bodies

MODULE- 2: Acts and Rules - Factories Act, Workman's Compensation Act , Employee State Insurance Act Effect of physical, Chemical & other hazards on Eye & Vision

MODULE 3: Occupational diseases - caused by physical agents, chemical agents and Visual Display Units – Visual Display Unit & Visual Display Terminal

MODULE 4: Sports terminologies & Sports Vision Examination Personal protective equipments - General, eye - selection, use and testing for Standards

MODULE 5: Eye Safety Workplace Assessment, Visual Requirement of Jobs

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos

Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT307	CONTACT LENS-II												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 308	DISPENSING OPTOMETRY	L	T	P	C
Version	Date of Approval:	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

Skills to be acquired at the end of this course

- **Reading of spectacle prescription**
- **Counseling the patient**
- **Lens edge thickness calculation**
- **Frame & lens measurements and selection**
- **Writing spectacle lens order**
- **Facial measurements - Interpupillarydistance measurement and measuring heights (single vision, multifocal, progressives)**
- **Lens verification and axis marking and fitting of all lens types**
- **Final checking of finished spectacle with frame adjustments**
- **Delivery and follow-up**
- **Troubleshooting complaints and handling patient's questions.**

Course Outcomes

On completion of this course, the students will be able to Counsel the patient, Lens edge thickness calculation, Frame & lens measurements and selection and Writing spectacle lens order

Catalog Description

This course will deal with the dispensing aspects of spectacle lenses and frames needed to manage the customer in an Optical set up, from counseling to delivering the spectacles.

Text 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

Reference Books

1. David Wilson, Steve stenersen: Practical optical workshop, OTEN- DE, NSW TAFE Commission, 2002.
2. Margaret Dowaliby: Practical Aspects of Ophthalmic optics, Fourth edition, Butterworth Heinemann, USA, 2001

Course Content

MODULE 1: Components of spectacle prescription & interpretation, transposition, Add and near power relation. Frame selection – based on spectacle prescription, professional requirements, age group, face shape. Measuring Inter-pupillary distance (IPD) for distance
& near, bifocal height.

MODULE 2: Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments – facial wrap, pantoscopic tilt. Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements).

MODULE 3: Neutralization – Hand & lensometer, axis marking, prism marking, Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)

MODULE 4: Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories – Bands, chains, boxes, slevets, cleaners, screwdriver kit. Spectacle repairs – tools, methods, soldering, riveting, frame adjustments.

MODULE 5: Special types of spectacle frames, ¾Monocles, ¾Ptosis crutches, ¾Industrial safety glasses, ¾Welding glasses, Frame availability in Indian market

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT308	**DISPENSING OPTOMETRY**												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 354	SYSTEMIC CONDITION & THE EYE(POSTERIOR SEGMENT DISEASE)(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basic of systemic condition and eye.

Course Outcomes

On completion of this course, the students will be able to understand Pathophysiology, classification, clinical examination, diagnosis of diseases like Arterial Hypertension, Diabetes mellitus, Tropical Disease and the Eye: Leprosy, Syphilis, Malaria, Neurological disease and the eye.

Catalog Description

This subject deals with the pathophysiology of hypertension, diabetes, Acquired Heart Disease, Connective Tissue Disease, Thyroid Disease, Tuberculosis, Vitamin deficiency and the eye, Visual pathway lesions, Papilloedema, Genetic disorders and the eye, Phacomatoses & the eye.

Text Books

1. *Clinical Ophthalmology – Jack J. Kanski*

Reference Books

1. Clinical Ophthalmology – Jack J. Kanski

Course Content

1. Arterial Hypertension: Pathophysiology, classification, clinical examination, diagnosis, complications, management, Hypertension and the eye.

2. Diabetes mellitus: Pathophysiology, classification, clinical features, diagnosis, complications, management, Diabetes mellitus and the eye.

3. Acquired Heart Disease – Embolism, Rheumatic heart disease, Sub acute bacterial endocarditic.
Heart disease & the eye.

4. Malignancy: Definitions, nomenclature, characteristics of benign & malignant neoplasms. Grading and staging of cancer, diagnosis, priniples of treatment. Neoplasia and the eye.

5. Connective Tissue Disease: Anatomy and path physiology: Arthritis.

6. Thyroid Disease: Anatomy and physiology of the thyroid gland, Classification of thyroid disease, Diagnosis, complications, clinical features, management of thyroid disease involving eye.

7. Tuberculosis: Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye.

8. Tropical Disease and the Eye: Leprosy, Syphilis. Malaria.

9. Vitamin deficiency and the eye

10. Neurological disease and the eye: Classification of neurological diseases, Demyelinating diseases

11. Visual pathway lesions

12. Papilloedema.

13. Genetic disorders and the eye.

14. Phacomatoses & the eye.

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
OPT354	**SYSTEMIC CONDITION & THE EYE(POSTERIOR SEGMENT DISEASE) (PRACTICAL)**												

1=Addressed to small extent
2= Addressed significantly
3=Major part of course

OPT355	CONTACT LENS-II(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

To understand the basic of occupational optometry.

Course Outcomes

On completion of this course, the students will be able to understand Occupational health, hygiene and safety, International bodies- International Labor Organization(ILO), World Health Organization(WHO), National bodies , Occupational diseases.

Catalog Description

This subject involves study of Occupational health, Acts and Rules - Factories Act, Workman's Compensation Act, Employee State Insurance Act Effect of physical, Chemical & other hazards on Eye & Vision, Occupational diseases - caused by physical agents, chemical agents and Visual Display Units – Visual Display Unit & Visual Display Terminal, Sports terminologies & Sports Vision Examination Personal protective equipments - General, eye - selection, use and testing for Standards.

Text Books

1. Eye Essentials- Environmental and Occupational Optometry, by Gordon Carson

Reference Books

1. *Eye Essentials- Environmental and Occupational Optometry, by Gordon Carson*

Course Content

MODULE 1: Introduction to Occupational health, hygiene and safety, International bodies- International Labor Organization(ILO), World Health Organization(WHO), National bodies

MODULE- 2: Acts and Rules - Factories Act, Workman's Compensation Act , Employee State Insurance Act Effect of physical, Chemical & other hazards on Eye & Vision

MODULE 3: Occupational diseases - caused by physical agents, chemical agents and Visual Display Units – Visual Display Unit & Visual Display Terminal

MODULE 4: Sports terminologies & Sports Vision Examination Personal protective equipments - General, eye - selection, use and testing for Standards

MODULE 5: Eye Safety Workplace Assessment, Visual Requirement of Jobs

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	Internal	SEE
Marks	30	70
Total Marks	100	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos

Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT355	CONTACT LENS-II(PRACTICAL)												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OPT 356	DISPENSING OPTOMETRY(PRACTICAL)	L	T	P	C
Version	Date of Approval:	0	0	2	1
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

Skills to be acquired at the end of this course

• Reading of spectacle prescription
• Counseling the patient
• Lens edge thickness calculation
• Frame & lens measurements and selection
• Writing spectacle lens order
• Facial measurements - Interpupillarydistance measurement and measuring heights (single vision, multifocal, progressives)
• Lens verification and axis marking and fitting of all lens types
• Final checking of finished spectacle with frame adjustments
• Delivery and follow-up
• Troubleshooting complaints and handling patient's questions.

Course Outcomes

On completion of this course, the students will be able to Counsel the patient, Lens edge thickness calculation, Frame & lens measurements and selection and Writing spectacle lens order

Catalog Description

This course will deal with the dispensing aspects of spectacle lenses and frames needed to manage the customer in an Optical set up, from counseling to delivering the spectacles.

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Reference Books

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4. Margaret Dowaliby: Practical Aspects of Ophthalmic optics, Fourth edition, Butterworth Heinemann, USA, 2001

Course Content

MODULE 1: Components of spectacle prescription & interpretation, transposition, Add and near power relation. Frame selection – based on spectacle prescription, professional requirements, age group, face shape. Measuring Inter-pupillary distance (IPD) for distance
& near, bifocal height.

MODULE 2: Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments – facial wrap, pantoscopic tilt. Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements).

MODULE 3: Neutralization – Hand & lensometer, axis marking, prism marking, Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)

MODULE 4: Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories – Bands, chains, boxes, slevets, cleaners, screwdriver kit. Spectacle repairs – tools, methods, soldering, riveting, frame adjustments.

MODULE 5: Special types of spectacle frames, ¾Monocles, ¾Ptosis crutches, ¾Industrial safety glasses, ¾Welding glasses, Frame availability in Indian market

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	**Course Outcomes (COs)**	**Mapped Programme Outcomes**

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPT356	**DISPENSING OPTOMETRY(PRACTICAL)**												

1=Addressed to small extent

2= Addressed significantly

3=Major part of course

OVT309	Vision Technician-II	L	T	P	C
Version 1.0	Date of Approval: 11 – 01 – 2016	3	0	0	3
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

This program is aimed at training candidates for the job of a "Vision Technician", in the "Healthcare" Sector/Industry and aims at building the following key competencies amongst the learner

Course Outcomes

• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.
• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.
• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.
• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.
• Demonstrate bio medical waste management.
• Practice infection control measures.
• Demonstrate safe practices to use equipment's required in their role.
• Demonstrate safe handling and storing of documents, record maintenance etc.
• Demonstrate techniques to maintain the personal hygiene needs
• Demonstrate professional behavior, personal qualities and characteristics of a Vision Technician
• Demonstrate good communication and team worker ability in the role of Vision Technician

Reference Books

1.AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
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10. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

COURSE CONTENT

Module 1

Basic Optics:

To understand the principles, concepts of light and vision • Understanding Eye as refractive apparatus
• To develop an understanding for prescription of Glasses & lenses

Ophthalmic Lens, Refraction Errors & Correction Of Errors:

To gain understanding regarding ophthalmic glasses, Astigmatic lenses, Prisms, contact lens, measurement and unit of power etc
• To understand the principles, concepts, instruments, and methods in optics
• Understanding of geometric optics
• To develop an understanding of clinical optics

Vision Assessment:

To know different ways to check visual acuity
• To be able to conduct torch examination of different parts of eye
• To be able to select appropriate visual acuity test and correct illumination in a testing room
• Understanding of using Snellen chart according to patient preferences
• To be able to use occulder and pinhole
• To be able to instill mydriatic or cycloplegic drops or ointments as indicated

Module 2

Spectacles ; Preparation & Dispensing:

To be able to confirm patient's existing use of optical correction
• To develop broad understanding for evaluating optical prescription of spectacles prescribed by specialist
• To distinguish between different types of lenses
• To be able to identify the optical centre of a lens and lens decentration
• To understand regarding principles of focimetry and different types of focimeters
• To obtain various facial frame measurements using standard measuring devices
• To be able to differentiate between frame & lens
• To develop broad understanding for filling laboratory order forms
• To be able to utilize lens focimeters, gauges, and clocks to ascertain power, axis, major (prism) reference positions, center and edge thicknesses, and prism for single-vision and multi-focal lenses

Ophthalmic Equipment:

To understand regarding equipment used in ophthalmology department and their storage process
• To gain understanding regarding cleaning & sterilization of instrument, fumigation, Swab, pads, drums, autoclaving.
• To be able to verbalize the role of VT before any surgical procedure or operation or any procedure
• To be able to understand requirements and protocols for maintenance and calibration of equipment

Module 3

Soft Skills And Communication II:

Learn basic reading and writing skills

• Learn sentence formation • Learn grammar and composition

• Learn how to enhance vocabulary

• Learn Goal setting, team building, team work, time management, thinking and reasoning & communicating with others

Common Ophthalmic Emergencies:

Understand the common ophthalmic emergencies

• To understand what to do in ophthalmic emergencies

• To gain understanding regarding organization's emergency procedures and responsibilities for handling emergencies situations

Sensitization Towards Organization Policies & Procedure:

• Understand the need to follow organization policies and procedures • Understand techniques to remove spills in accordance with policies and procedures of the organizatio

Module 4

Observing And Reporting:

Understand the importance of observing and reporting before, during & after procedure

• Understanding the importance of timely information to the appropriate authority in case of routine and emergency situations.

Infection Control Measures - Policies and Procedures:

• To understand the importance of hand washing and its steps
• To understand ; Needle Stick Injuries (NSI)
• To gain understanding regarding transmission based precautions and & its types
• To understand the meaning of ventilation and state it's clinical significance
• To understand the principles of linen management
• To understand the process of cleaning, sterilization and disinfection of equipment and work area along with it's significance
• To understand various occupational hazards for a health worker

Confidentiality, Documentation & Records:

• Understand guidelines for documentation
• Learn various types of records of importance for vision technician
• Understand use and importance of records.
• To be able to maintain the confidentiality of the medical records
• Understand abbreviations and symbols
• Enter, transcribe, record, store, or maintain information in written or electronic/magnetic form

Module 5

Professional Behaviour In Healthcare Setting:

• How to maintain restful environment
• Learn general and specific etiquettes to be observed on duty
• Understand need for compliance of organizational hierarchy and reporting
• Understand the legal and ethical issues
• Understand importance of conservation of resources

Basic Computer Knowledge:

• To gain broad understanding about Application of computers in • Practice • Give Introduction to Computers: • Block diagram • Input and Output devices • Storage devices • Give Introduction to operating systems • Need of Operating systems (OS) • Function of OS • Windows 2000 – Utilities and basic operations

Mode of Evaluation: The theory performance of students is evaluated as

	Theory	
Components	**Internal**	**SEE**
Marks	**30**	**70**
Total Marks	**100**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between Cos and Pos		
Sl. No.	Course Outcomes (COs)	Mapped Programme Outcomes
1.	**• Demonstrate bio medical waste management.** **• Practice infection control measures.**	1,2,3,4,5,6,7,8,9,10

	• Demonstrate safe practices to use equipment's required in their role. • Demonstrate safe handling and storing of documents, record maintenance etc. • Demonstrate techniques to maintain the personal hygiene needs • Demonstrate professional behavior, personal qualities and characteristics of a Vision Technician • Demonstrate good communication and team worker ability in the role of Vision Technician	

		Optometry Knowledge	Thinking Abilities	Planning Abilities	Leadership skills	Professional Identity	The Optometry and society	Environment and sustainability	Ethics	Individual or team work	Communication	Modern & Usage	Life-long Learning
		1	2	3	4	5	6	7	8	9	10	11	12
OPTHSS-II	Vision Technician-II	2	2	2	2	1	3	1	2	2	2		

1=Addressed to small extent
2=Addressed significantly
3=Major part of course

OVT357	Vision Technician-II Lab	L	T	P	C
Version 1.0	Date of Approval: 11 – 01 – 2016	0	0	4	2
Pre-requisites//Exposure					
Co-requisites					

Course Objectives

This program is aimed at training candidates for the job of a "Vision Technician", in the "Healthcare" Sector/Industry and aims at building the following key competencies amongst the learner

Course Outcomes

• Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings.
• Demonstrate the ability to perform clinical skills essential in performing administrative and certain clinical duties i.e. scheduling appointments, maintaining medical records, recording vital signs and medical histories, preparing patients for examination, and dispensing ophthalmic prescription.
• Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity.
• Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.
• Demonstrate bio medical waste management.
• Practice infection control measures.
• Demonstrate safe practices to use equipment's required in their role.
• Demonstrate safe handling and storing of documents, record maintenance etc.
• Demonstrate techniques to maintain the personal hygiene needs
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		1	2	3	4	5	6	7	8	9	10	11	12
OVT309	Vision Technician-II Lab	2	2	2	2	1	3	1	2	2	2		

Name of The Course	CLINICAL INTERNSHIP INCLUDING PROJECT WORK			
Course Code	OPT401			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	PJ	C
	0	0	040	20

Course Objectives:

Course Outcomes

CO1	To understand about the basic optometric set up in a clinic
CO2	To get acquainted with the procedures carried out in a patient care
CO3	To apply theoretical knowledge in diagnosis and detection of an ocular ailment
CO4	To understand the role of research in inculcating an evidence based practice
CO5	To understand the need of ethical approval prior to starting a research project

Text Book (s)

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2. **C R Kothari, 'Research Methodology'**

Unit-1 **8 hours**
Introduction and Orientation- 1. An orientation programme to introduce hospital based patient care 2. Vision, mission of the organisation with accreditation body guidelines to be followed(if any)
Unit-2 **8 hours**
Clinical procedures in Optometry 1. Hands on training to be conducted keeping the students on observation prior to handling patients 2. Materials, eyedrops to be required for carrying out tests in a daily basis 3. Proper introduction of waste management system
Unit-3 **8 hours**
Clinical Research 1. Introducing the need of clinical research in carrying out an evidence based patient care 2. Formulating a research proposal 3. Availability of resources to be required for carrying out the experiments
Unit-4 **8 hours**
Research Methodology and Ethical approval 1. Ethical board review of the study proposed

2. Post approval, sampling and collection of data 3. Running statistical analysis to agree or disagree the hypothesis 4. Discussion based on literature
Unit-5 **8 hours**
Publication and outcome 1. Writing the dissertation with all the annexure 2. Writing a scientific paper in a good indexed journal

Continuous Assessment Pattern

Internal Assessment (IA)		**End Term Test (ETE)**	**Total Marks**
30		**70**	**100**

Name of The Course	CLINICAL INTERNSHIP INCLUDING PROJECT WORK			
Course Code	OPT402			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P J	C
	0	0	040	20

Course Objectives:

Course Outcomes

CO1	To understand about the basic optometric set up in a clinic
CO2	To get acquainted with the procedures carried out in a patient care
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