



**GALGOTIAS
UNIVERSITY**

Syllabus of Bachelor of Optometry

School of Medical & Allied Sciences

Name of School: _____
Paramedical and Allied Health Sciences

Department: _____

2017-2021

Year: _____

School of Medical and Allied Sciences



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

Program: B. Optometry

Scheme: 2017 – 2021

Course Curriculum
Year I (Semester I)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP101	General Anatomy-I	3	0	0	0	3	30	70	100
2.	BOP102	General Physiology-I	3	0	0	0	3	30	70	100
3.	BOP103	Basic & Ocular Biochemistry	3	0	0	0	3	30	70	100
4.	BOP104	Geometrical Optics-I	3	0	0	0	3	30	70	100
5.	BOP105	Nutrition	2	0	0	0	2	30	70	100
6.	EVS102	Energy & Environmental Sciences	3	0	0	0	3	30	70	100
7.	ENG133	Communicative English-I	3	0	0	0	3	30	70	100
8.	BOP151	General Anatomy-I (P)	0	0	2	0	1	30	70	100
9.	BOP152	General Physiology-I (P)	0	0	2	0	1	30	70	100
10.	BOP153	Basic & Ocular Biochemistry (P)	0	0	2	0	1	30	70	100
11.	BOP154	Geometrical Optics-I (P)	0	0	2	0	1	30	70	100
12.	ENG183	Communicative English-I (P)	0	0	2	0	1	30	70	100
		Total Credits					25			

Year I (Semester II)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP201	Ocular Anatomy	3	0	0	0	3	30	70	100
2.	BOP202	Ocular Physiology	3	0	0	0	3	30	70	100
3.	BOP203	Physical Optics	3	0	0	0	3	30	70	100
4.	BOP204	Geometrical Optics-II	3	0	0	0	3	30	70	100
5.	ENG233	Communicative English-II	3	0	0	0	3	30	70	100
6.	BOP251	Ocular Anatomy (P)	0	0	2	0	1	30	70	100
7.	BOP252	Ocular Physiology (P)	0	0	2	0	1	30	70	100
8.	BOP253	Physical Optics(P)	0	0	2	0	1	30	70	100
9.	BOP254	Geometrical Optics-II(P)	0	0	2	0	1	30	70	100
10.	ENG283	Communicative English-II (P)	0	0	2	0	1	30	70	100
		Total Credits					20			

Year II (Semester III)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP301	Ocular Microbiology	2	0	0	0	2	30	70	100
2.	BOP302	Visual Optics-I	2	0	0	0	2	30	70	100
3.	BOP303	Optometric Optics-I	3	0	0	0	3	30	70	100
4.	BOP304	Optometric Instruments	2	0	0	0	2	30	70	100
5.	BOP305	Ocular Disease-I	3	0	0	0	3	30	70	100
6.	BOP306	Clinical Examination of Visual System	2	0	0	0	2	30	70	100
7.	BOP307	Indian Medicine and Telemedicine	2	0	0	0	2	30	70	100
8.	BOP308	Computer Fundamentals	3	0	0	0	3	30	70	100
9.	BOP351	Visual Optics-I (P)	0	0	2	0	1	30	70	100
10.	BOP352	Optometric Instruments (P)	0	0	2	0	1	30	70	100
11.	BOP353	Ocular Disease-I (P)	0	0	2	0	1	30	70	100
12.	BOP354	Computer Fundamentals (P)	0	0	2	0	1	30	70	100
		Total Credits					23			

Year II (Semester IV)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP401	Optometric Optics-II & Dispensing Optics	3	0	0	0	3	30	70	100
2.	BOP402	Visual Optics-II	2	0	0	0	2	30	70	100
3.	BOP403	Ocular Disease-II	3	0	0	0	3	30	70	100
4.	BOP404	Pathology	2	0	0	0	2	30	70	100
5.	BOP405	Basic and Ocular Pharmacology	3	0	0	0	3	30	70	100
6.	BOP406	Introduction to Quality Patient, Safety & Medical Psychology	3	0	0	0	3	30	70	100
7.	BOP451	Optometric Optics-II & Dispensing Optics (P)	0	0	2	0	1	30	70	100
8.	BOP452	Visual Optics-II (P)	0	0	2	0	1	30	70	100
9.	BOP453	Ocular Disease-II (P)	0	0	2	0	1	30	70	100
10.	BOP454	Basic and Ocular Pharmacology (P)	0	0	2	0	1	30	70	100
		Total Credits					20			

Year III (Semester V)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP501	Contact lens-I	3	0	0	0	3	30	70	100
2.	BOP502	Low Vision care	2	0	0	0	2	30	70	100
3.	BOP503	Geriatric & Pediatric Optometry	3	0	0	0	3	30	70	100
4.	BOP504	Binocular Vision-I	3	0	0	0	3	30	70	100
5.	BOP505	Systemic Disease	3	0	0	0	3	30	70	100
6.	BOP506	Research Methodology & Biostatistics	2	0	0	0	2	30	70	100
7.	LLL101	Universal human Values & Ethics	3	0	0	0	3	30	70	100
8.	BOV507	Vision Technician-I	5	0	0	0	3	30	70	100
9.	BOP551	Contact lens-I (P)	0	0	2	0	1	30	70	100
10.	BOP552	Low Vision Care (P)	0	0	2	0	1	30	70	100
11.	BOP553	Binocular Vision-I (P)	0	0	2	0	1	30	70	100
12.	BOV554	Vision Technician-I(P)	0	0	4	0	2	30	70	100
		Total credits					27			

Year III (Semester VI)

S. No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP601	Contact lens-II	3	0	0	0	3	30	70	100
2.	BOP602	Binocular Vision-II	3	0	0	0	3	30	70	100
3.	BOP603	Public Health & Community Optometry	2	0	0	0	2	30	70	100
4.	BOP604	Practice Management, Medical Law and Ethics	2	0	0	0	2	30	70	100
5.	BOP605	Occupational Optometry	2	0	0	0	2	30	70	100
5.	BOV606	Vision Technician-II	5	0	0	0	3	30	70	100
6.	BOP651	Contact lens-II (P)	0	0	2	0	1	30	70	100
7.	BOP652	Binocular Vision-II (P)	0	0	2	0	1	30	70	100
9.	BOV653	Vision Technician-II(P)	0	0	2	0	1	30	70	100
8.		Research Project								
	BOP653	Contact lens	0	0	0	4	2	30	70	100
	BOP654	Binocular Vision								
	BOP655	Optometric Instruments								
		TOTAL					20			

Year IV (Semester VII)

S.No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme		
								Internal	External	Total
1.	BOP701	Clinical Internship Including Research Project Work	0	0	40	0	20	30	70	100
		TOTAL					20			

Year IV (Semester VIII)

S.No	Course Code	Subject	L	T	P	J	C	Evaluation Scheme			
								Internal	External	Total	
1.	BOP801	Clinical Internship Including Research Project Work	0	0	40	0	20	30	70	100	
		TOTAL					20				
		Total Credits	162 Credits								

NOTE:

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

CBL-Credit Based Learning

PBL-Project Based Learning

Name of The Course	General Anatomy-I			
Course Code	BOP101			
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.
CO6	To be able to apply the knowledge about recent advances in General Anatomy

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.

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

Unit VI

8 Hrs

Advancements in General Anatomy

Anatomy and its impact on medicine

Recent Advances in the Study and Techniques of Anatomy

New Discoveries in Human Anatomy

Continuous Assessment Pattern

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

Name of The Course	General Physiology-I			
Course Code	BOP102			
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 Cell Definition, Structure and function of Cytoplasmic Organelles, Reproduction-Meosis, Mitosis.	8 Hrs
Unit II The important physico-chemical laws applied to physiology Diffusion, Osmosis, Bonding, Filtration, Dialysis, Surface Tension, Adsorption, Colloid.	8 Hrs
Unit III 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	8 Hrs

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,

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

Unit VI

8 Hrs

Recent advances in the field of Physiology
Recent studies going on in general biology, Review of different articles

Continuous Assessment Pattern

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

Name of The Course	Basic & Ocular Biochemistry			
Course Code	BOP103			
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 Prasanna 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 Prasanna 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 Carbohydrates: Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function)	8 Hrs
Unit II Proteins: Amino acids, peptides, and proteins (general properties & tests with a few examples like glycine, tryptophan, glutathione, albumin, hemoglobin, collagen)	8 Hrs
Unit III Lipids: Fatty acids, saturated and unsaturated, cholesterol and triacylglycerol, phospholipids and plasma membrane	8 Hrs

Unit IV Vitamins: General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)	8 Hrs
Unit V 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	8 Hrs
Unit VI Recent Advancement in Basic & Ocular Biochemistry	8Hrs

Continuous Assessment Pattern

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

Name of The Course	Geometrical Optics-I			
Course Code	BOP104			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives

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

Course Outcomes

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

CO1	To understand about the light behaviour and its propagation in a variety of medias
CO2	Phenomenon of reflection and refraction of light at boundaries between media and subsequent image formation
CO3	Reflections at plane and spherical surfaces and refractions at plane
CO4	Spherical, cylindrical and toric surfaces will be studied in this course
CO5	Surfaces, lenses and their imaging properties

TEXT BOOK:

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

REFERENCE BOOKS:

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

Course Content

Unit I: . Nature of light	8 hours
<ol style="list-style-type: none"> 1 Nature of light –light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index. 2. Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance 3. Refractive index; its dependence on wavelength 4. Fermat’s and Huygen’s Principle –Derivation of laws of reflection and refraction (Snell’s law) from these principles 5. Plane mirrors –height of the mirror; rotation of the mirror 6. Reflection by a spherical mirror –paraxial approximation; sign convention; derivation of vergence equation 7. Imaging by concave mirror, convex mirror 8. Reflectivity; transmissivity; Snell’s Law, Refraction at a plane surface 	

<p>Unit II: Glass</p> <p>9 Glass slab; displacement without deviation; displacement without dispersion</p> <p>10. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism</p> <p>11. Prisms; angular dispersion; dispersive power; Abbe's number.</p> <p>12. Definition of crown and flint glasses; materials of high refractive index</p> <p>13. Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; its dependence on refractive index</p> <p>14. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula</p> <p>15. Paraxial approximation; derivation of vergence equation</p> <p>16. Imaging by a positive powered surface and negative powered surface</p> <p>.</p>	<p>8 hours</p>
<p>Unit III: Vergence</p> <p>17. Vergence at a distance formula; effectivity of a refracting surface</p> <p>18. Definition of a lens as a combination of two surfaces; different types of lens shapes.</p> <p>19. Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths</p> <p>20. Newton's formula; linear magnification; angular magnification</p> <p>21. Nodal Planes.</p> <p>22. Thin lens as a special case of thick lens; review of sign convention</p> <p>23. Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions</p> <p>24. Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions</p>	<p>8 hours</p>
<p>Unit IV : Prentice's Rule</p> <p>. Prentice's Rule</p> <p>26. System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.</p> <p>27. System of more than two thin lenses; calculation of equivalent power using magnification formula</p> <p>28. Vergence and vergence techniques revised.</p> <p>29. Gullstrand's schematic eyes, visual acuity, Stile Crawford</p> <p>30. Emmetropia and ametropia</p> <p>31. Blur retinal Imaginary</p> <p>32. Correction of spherical ametropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic</p> <p>.</p>	<p>8 hours</p>
<p>Unit V: Thin lens model of the eye</p> <p>33. Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.</p> <p>34. Aperture stops- entrance and exit pupils.</p> <p>35. Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.</p> <p>36. Accommodation –Accommodation formulae and calculations.</p> <p>37. Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.</p> <p>38. Spatial distribution of optical information- modulation transfer functions- Spatial filtering- applications.</p> <p>39. Visual optics of aphakia and pseudophakia.</p>	<p>8 hours</p>
<p>Unit 6: Recent Advancements in Geometrical Optics</p>	
<ul style="list-style-type: none"> • Femtosecond Optics • High-Intensity Laser-Matter Interactions 	

- Advanced Materials for the Generation and Control of Light
- Materials for Shaping and Focusing Optical Radiation

Continuous Assessment Pattern

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

Name of The Course	Nutrition			
Course Code	BOP105			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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

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

CO1	To understand the knowledge on Balanced diet
CO2	To have an understanding on the requirement of protein, carbohydrates, vitamins in the body
CO3	To have an idea on the process of aging and vital requirements for that
CO4	To have an understanding on the adverse affects on ocular nutritional supplements
CO5	To have an correlation on the systemic requirements and ocular requirements

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

Reference Books

1. Mukesh Singhal and Niranjana G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.

Course Content

Unit I: Introduction	8 hours
History of Nutrition	
Nutrition as a science	
Food groups, RDA	
Balanced diet, diet planning.	
Assessment of nutritional status	

<p>Energy</p> <ul style="list-style-type: none"> Units of energy. Measurements of energy and value of food Energy expenditure. Total energy/calorie requirement for different age groups and diseases. Satiety value Energy imbalance- obesity, starvation. Limitations of the daily food guide. 	
<p>Unit II: Protein</p> <ul style="list-style-type: none"> Sources and functions Essential and non- essential amino- acids. Incomplete and complete proteins Supplementary foods. PEM and the eye Nitrogen balance Changes in protein requirement. 	8 hours
<p>Unit III: Fat</p> <p>Fats</p> <ul style="list-style-type: none"> Sources and functions Essential fatty acids Excess and deficiency Lipids and the eye. Hyperlipidemia, heart diseases, atherosclerosis. Minerals <p>General functions and sources</p> <p>Macro and micro minerals associated with the eye.</p> <p>Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)</p>	8 hours
<p>Unit IV : Vitamin</p> <p>Vitamins</p> <p>General functions, and food sources</p> <p>Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A</p>	8 hours

Promoting sound habits in pregnancy, lactation and infancy.

Nutrient with antioxidant.

Properties

Digestion of Proteins, carbohydrates & lipids

Unit V: Miscellaneous Nutritional Diseases

8 hours

Miscellaneous Nutritional Diseases

Measles and associated eye disorders, low birth weight

Continuous Assessment Pattern

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

Name of The Course	Energy and Environmental Sciences			
Course Code	ENVS101			
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.

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.

Unit VI: Recent advancements in environmental sciences**9 hours**

Introduction, Basic piples 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

Name of The Course	Communicative English-I			
Course Code	ENG133			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Develop the understanding into the communication and language as its medium
CO2	Develop the basic understanding of spoken English
CO3	Improve their reading fluency skills through extensive reading
CO4	Use and assess information from academic sources, distinguishing between main ideas and details
CO5	Compare and use a range official support through formal and informal writings

Text Books

1. Course Title: **Better Spoken English** by Prof. Shreesh Chaudhary, Department of Humanities and Social Sciences, IIT Madras. (NPTEL)
<https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLbMVogVj5nJT3a24lj4KOkQCOElxcDQRS>
2. Course Title: **Understanding Creativity and Creative Writing** by Prof. Neelima Talwar(NPTEL)
<http://www.digimat.in/nptel/courses/video/109101017/L01.html>

Reference Books

3. Course Title: **Communication Skills** by Dr. T. Ravichandran, Department of Humanities and Social Sciences (NPTEL)
https://www.youtube.com/watch?v=cQruENyLNYI&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaHaH
4. Course Title: **English Language for Competitive Examinations** By Prof. Aysha Iqbal (NPTEL)
<https://www.youtube.com/watch?v=6xFaxIwwq0s&list=PLqGm0yRYwTjSdCmTeXLJLJkHXmC6CBEw>

Course Content

Unit I: Communication	8 hours
<ul style="list-style-type: none"> • Communication: Definition, Types (Verbal and Non-verbal), Models, Language as a tool of communication • The flow of Communication, Communication Networks • Barriers to Communication 	

<ul style="list-style-type: none"> Professional Communication 	
Unit II: Professional Communication <ul style="list-style-type: none"> Features of professional communication Importance of Business/Technical Communication 	8 hours
Unit III: Word Formation <ul style="list-style-type: none"> Word Formation Basic sentence structure Common Errors: Subject- Verb agreement, prepositions, Articles, Place of adverb, Consistency of tenses. 	8 hours
Unit IV : Paragraph <ul style="list-style-type: none"> Paragraph Writing: Methods, unity and coherence Reading Skills: Types, Strategies, Barriers,	8 hours
Unit V: Official Communication <ul style="list-style-type: none"> Official Communication: Letter, Memo, Agenda and Minutes of meeting, notice and circular, and email Job Application 	9 hours

Continuous Assessment Pattern

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

Name of The Course	GENERAL ANATOMY PRACTICAL-I			
Course Code	BOP151			
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
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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

Name of The Course	General Physiology Lab-I			
Course Code	BOP152			
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
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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 demonstrate 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 one's own blood by the Sahli's method
5. To demonstrate total leukocyte count by the hemacytometer
6. Experiment to find normal clotting time
7. Experiment to find normal bleeding time.

Continuous Assessment Pattern

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

Name of The Course	Basic Biochemistry Lab			
Course Code	BOP153			
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 Prasanna and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990
2. D.R. Whitehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

Course Outcome

CO-I	Students should be able to understand structure, function, interrelationship of biomolecules, principles of various aspects of metabolism and their regulatory pathways
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LIST OF EXPERIMENTS:

1. Qualitative analysis of abnormal constituents of urine
2. Demonstration of blood gas and electrolytes
3. Demonstration of glucometer
4. Qualitative analysis of unknown carbohydrates
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

Name of The Course	Geometrical Optics Lab-I			
Course Code	BOP154			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

Course Outcome

CO-I	Remember knowledge of mirrors and lenses, Predict and interpret the basic properties of the images formed on the retina by the optics of the eye.
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LIST OF EXPERIMENTS:

1. Refraction through a Prism
2. The Concave mirror - u-v method
3. To measure focal length of a lens
4. Image formation by a convex mirror
5. Image formation by a concave mirror
6. Image formation by a convex lens
5. Image formation by a concave lens

Continuous Assessment Pattern

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

Name of The Course	Communicative English-I(P)			
Course Code	ENG183			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Develop the understanding into the communication and language as its medium
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Text Books

- 1 Course Title: **Better Spoken English** by Prof. Shreesh Chaudhary, Department of Humanities and Social Sciences, IIT Madras. (NPTEL)
<https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLbMVogVj5nJT3a24lj4KOkQCOElxcDQrs>
- 2 Course Title: **Understanding Creativity and Creative Writing** by Prof. Neelima Talwar(NPTEL)
<http://www.digimat.in/nptel/courses/video/109101017/L01.html>

Reference Books

- 3 Course Title: **Communication Skills** by Dr. T. Ravichandran, Department of Humanities and Social Sciences (NPTEL)
https://www.youtube.com/watch?v=cQruENyLNYI&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH
- 4 Course Title: **English Language for Competitive Examinations** By Prof. Aysha Iqbal (NPTEL)
<https://www.youtube.com/watch?v=6xFaXIwwq0s&list=PLqGm0yRYwTjSdCmTeXLJLJkHXmC6CbEw>

The following activities will be conducted in lab classes:

- Introduction
- Extempore
- Movie Review
- Phonetics (Sounds)
- Phonetics (Transcription)
- Practice on Clear Pronunciation
- Practice on Tense Buster
- Role Play
- Group Discussion

- Group Presentation by Students

Continuous Assessment Pattern

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

Name of The Course	Ocular Anatomy			
Course Code	BOP201			
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 to 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- 3.1 Aqueous humor 3.2 Anterior chamber 3.3 Posterior chamber 3.4 Lens 3.5 Vitreous body	8 hours
Unit IV : Eyelids Eyelids	8 hours
Unit V: Conjunctiva Conjunctiva, Embryology	8 hours
Unit VI: Recent Advancement Recent Advancement in Ocular Anatomy Recent Advances in ocular drug delivery systems New Technologies in Eye surgery	8 hours

Continuous Assessment Pattern

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

Name of The Course	Ocular Physiology			
Course Code	BOP202			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Explain the normal functioning of all structures of the eye and their interactions
CO2	Illustrate physiological aspects of normal growth and development of the eye
CO3	Explain the phenomenon of vision
CO4	Identify the physiological principles underlying pathogenesis and treatment of diseases of the eye
CO5	Illustrate and apply the knowledge in Identifying the malfunction in the ocular muscles and cranial nerves

Text Books

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

Reference Books

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

Course Content

Unit I: Layers of Eye	8 hours
Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe	
2. Extrinsic eye muscles, their actions and control of their movements	
3. Coats of the eye ball	
4. Cornea	
5. Aqueous humor and vitreous: Intra ocular pressure.	
Unit II: Iris and pupil	8 hours
6 Iris and pupil	
7. Crystalline lens and accommodation – presbyopia	
8. Retina – structure and functions	
9. Vision – general aspects of sensation	
10. Pigments of the eye and photochemistry	
Unit III: Visual stimulus, refractive errors	8 hours
12. Visual acuity, Vernier acuity and principle of measurement	
13. Visual perception – Binocular vision, stereoscopic vision, optical illusions	
14. Visual pathway, central and cerebral connections	
15. Colour vision and colour defects. Theories and diagnostic tests	
Unit IV Electrophysiology	8 hours

Introduction to electro physiology 17. Scotopic and Photopic vision 18. Color vision, Color mixing 19. Mechanism of accommodation 20. Retinal sensitivity and Visibility	8 Hours
Unit V: Visual function Receptive stimulation and flicker 22. Ocular, movements and saccades 23. Visual perception and adaptation 24. Introduction to visual psychology (Psychophysics)	8 hours
Unit VI : Recent Advances 25. Visual evoked potential 26. Visual cycle 27. Recent advances in research on Ocular physiology 28. Interdisciplinary research to evaluate biochemical composition of eye fluid	8hours

Continuous Assessment Pattern

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

Name of The Course	Physical Optics			
Course Code	BOP203			
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 Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

Reference Books

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

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: Interference	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	
15. Inverse square law of photometry; Lambert's law.	
16. Other units of light measurement; retinal illumination;	
Unit VI Recent Advancements in Hospital Waste	8 hour
Latest techniques of Segregation & disposal of Hospital waste	
Global policy of Hospital waste disposal	
Specialised techniques for specific areas	

Continuous Assessment Pattern

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

Name of The Course	Geometrical Optics-II			
Course Code	BOP204			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives

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

Course Outcomes

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

CO1	To generalise the basic knowledge of mirrors and lenses
CO2	To relate the basic properties of the images formed on the retina by the optics of the eye.
CO3	To generalise and explain the various refractive conditions based on the different phenomenon of light
CO4	To generalise and explain and apply the knowledge in correcting the refractive errors
CO5	To generalise and explain the prediction of light through different types of lenses and mirrors
CO6	To generalise and explain about recent advancements in Geometrical Optics

TEXT BOOK:

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

REFERENCE BOOKS:

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

Course Content

Unit I: . Eye & its Functions 1 Vergence and vergence techniques revised. Gullstrand's schematic eyes, visual acuity, Stile Crawford	8 hours
Unit II: Refractive Errors 9 Emmetropia and ametropia 4. Blur retinal Imaginary 5. Correction of spherical ammetropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic.	8 hours
Unit III: Astigmatism 17. Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification. 7. Aperture stops- entrance and exit pupils. 8. Astigmatism. - To calculate the position of the line image in a spher	8 hours

Unit IV : Accommodation & Presbyopia . Accommodation –Accommodation formulae and calculations. 10. Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field..	8 hours
Unit V: Post surgical Refractive errors 33. Spatial distribution of optical information- modulation transfer functions- Spatial filtering- applications. 12. Visual optics of aphakia and pseudophakia.	8 hours
Unit VI: Research advancements in Geometrical optics Quantum, Atomic, and Biological Optics Control of Atoms by Light Fundamental Quantum Limits of Measurement Light in Biology	6 hours

Continuous Assessment Pattern

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

Name of The Course	Communicative English-II			
Course Code	ENG233			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Develop the understanding into the communication and language as its medium
CO2	Develop the basic understanding of spoken English
CO3	Improve their reading fluency skills through extensive reading
CO4	Use and assess information from academic sources, distinguishing between main ideas and details
CO5	Compare and use a range official support through formal and informal writings

Text Books

- 1 Course Title: **Better Spoken English** by Prof. Shreesh Chaudhary, Department of Humanities and Social Sciences, IIT Madras. (NPTEL)
<https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLbMVogVj5nJT3a24lj4KOkQCOElxcDQrs>
- 2 Course Title: **Understanding Creativity and Creative Writing** by Prof. Neelima Talwar(NPTEL)
<http://www.digimat.in/nptel/courses/video/109101017/L01.html>

Reference Books

- 3 Course Title: **Communication Skills** by Dr. T. Ravichandran, Department of Humanities and Social Sciences (NPTEL)
https://www.youtube.com/watch?v=cQruENyLNYI&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH
- 4 Course Title: **English Language for Competitive Examinations** By Prof. Aysha Iqbal (NPTEL)
<https://www.youtube.com/watch?v=6xFaxIwwq0s&list=PLqGm0yRYwTjSdCmTeXLJLJkHXmC6CbEw>

Course Content

Unit I Technical Writing hours	8
<ul style="list-style-type: none"> • Technical Writing: Meaning, Types, Style, Features • Report: Types, Format, Structure, Citation, Planning and writing, Project report • 	

Unit II: Planning and Writing	8 hours
<ul style="list-style-type: none"> Manual and user guide: general layout, planning and writing 	
Unit III: Proposal	8 hours
<ul style="list-style-type: none"> Proposal: Types, format, structure, planning and writing Listening vs Hearing, Steps and Types of listening; Barriers of Listening, Methods to improve listening 	
Unit IV : Group Discussion	8
hours Group Discussion,	
Unit V: Presentations	9 hours
<ul style="list-style-type: none"> Spelling and Phonetic Inconsistencies in English Basics of Pronunciation, Organs of speech, articulation, Introduction to Sounds (IPA) Phonetic/Phonemic Transcription Presentation Strategies: Purpose, Audience and locale analysis, Non-verbal aspects, voice and pronunciation, effective PowerPoint preparation	

Continuous Assessment Pattern

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

Name of The Course	Ocular Anatomy Lab			
Course Code	BOP251			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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.
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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

List of Experiments

1. Experiment to study to understand the anatomical planes, movements and directions of the Eye Ball
2. Experiment to observe the model eye. To identify and learn the functions of the structures
3. Experiment to observe and learn the layers of Cornea
4. Experiment to observe and learn the layers of retina.
5. Experiment to learn and review the structures of the visual pathway
6. Experiment to study and review the structures of tearfilm.
7. Experiment to understand and review the Lacrimal gland and lacrimal Apparatus
8. Experiment to observe and understand the pupillary reflexes
9. Experiment to reveal any asymmetry of afferent input in the pupillary light

Continuous Assessment Pattern

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

Name of The Course	Ocular Physiology Lab			
Course Code	BOP252			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Explain the normal functioning of all structures of the eye and their interactions
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Text Books

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

Reference Books

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

List of Experiments

- To understand the types of Extra Ocular Muscles with their functions
- To understand the Assessment of movements and alignment of eyes by using Broad H test.
- To understand and perform the quantitative measurement of tears using schirmers test I
- To understand and perform the quantitative measurement of tears using schirmers test II
- To understand and perform the RAPD

Continuous Assessment Pattern

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

Name of The Course	Physical Optics			
Course Code	BOPT253			
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
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Text Books

- 1 Subrahmanyam N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

Reference Books

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

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 phosphoresence

Continuous Assessment Pattern

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

Name of The Course	Geometrical Optics Lab-II			
Course Code	BOPT254			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives

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

Course Outcomes

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

CO1	To generalise the basic knowledge of mirrors and lenses
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TEXT BOOK:

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

REFERENCE BOOKS:

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

List of Experiments

- 1 The study and understand the construction of a simple refracting telescope and calculate the magnification
- 2 The study and understand the construction of a simple low power microscope from two converging lenses
- 3 The study will observe interference fringes formed by a layer of air between two pieces of glass.
- 4 The student will observe polarized light and how it is affected when it passes through stressed transparent plastic materials
- 5 Diffraction of light very small aperture

Continuous Assessment Pattern

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

Name of The Course	Communicative English Lab-II			
Course Code	ENG283			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Develop the understanding into the communication and language as its medium
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Text Books

- 1 Course Title: **Better Spoken English** by Prof. Shreesh Chaudhary, Department of Humanities and Social Sciences, IIT Madras. (NPTEL)
<https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLbMVogVj5nJT3a24lj4KOkQCOElxcDQrs>
- 2 Course Title: **Understanding Creativity and Creative Writing** by Prof. Neelima Talwar(NPTEL)
<http://www.digimat.in/nptel/courses/video/109101017/L01.html>

Reference Books

- 3 Course Title: **Communication Skills** by Dr. T. Ravichandran, Department of Humanities and Social Sciences (NPTEL)
https://www.youtube.com/watch?v=cQruENyLNYI&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH
- 4 Course Title: **English Language for Competitive Examinations** By Prof. Aysha Iqbal (NPTEL)
<https://www.youtube.com/watch?v=6xFaxIwwq0s&list=PLqGm0yRYwTjSdCmTeXLJLJkHXmC6CbEw>

The following activities will be conducted in lab classes:

- Spin-a-yarn
- Drafting Catchphrases
- Picture Interpretation (Denotation and Connotation)
- Active Listening
- Reading between the lines
- Brief Biography of Female Personalities
- Rhythm and Intonation
- Public Speaking
- Mock Lecture
- Dialogue Writing

- Enacting scene(s) from critically appreciated movies

Continuous Assessment Pattern

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

Name of The Course	OCULAR MICROBIOLOGY			
Course Code	BOP301			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives:

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

Course Outcomes

CO1	To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites;
CO2	To acquire knowledge of the principles of sterilisation and disinfection in hospital and ophthalmic practice;
CO3	To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections
CO4	To understand basic principles of diagnostic ocular Microbiology.
CO5	To correlate the understanding of ocular health and systemic health

Text Book

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

Reference Book (s)

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

Course Content

Unit-1 Introduction 1 ntrouction to microbiology 2. Morphology & classification of microorganisms 3. Sterilisation & Disinfecatnts used in the Hospital	8 hours
Unit-2 Common bacterial infections of the eye. Common bacterial infections of the eye.	8 hour
Unit-3 Common fungal infections of the eye . Common fungal infections of the eye	8 hour
Unit-4 Common viral infections of the eye. Common viral infections of the eye.	8 hour
Unit-5 Common parasitic infections of the eye. . Common parasitic infections of the eye.	8 hour

Continuous Assessment Pattern

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

Name of The Course	VISUAL OPTICS-I			
Course Code	BOP302			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives:

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

Course Outcomes

CO1	Students should be able to understand the fundamentals of optical components of the eye
CO2	student should able to gain the theoretical knowledge on the measurement of visual acuity
CO3	student should be able to coorelate the skill on visual acuity measurement
CO4	student should able to understand the objective clinical refraction
CO5	students should able to understand the subjective clinical refraction

Text Book

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

Reference Book (s)

- 1 M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
- 2 T Grosvenor: Primary Care Optometry, 4th edition, Butterworth –heinneman, USA, 2002
- 3 WJ Benjamin: Borish’s clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006
- 4 H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.

Course Content

Unit-1 Introduction	8 hours
1. Review of Geometrical Optics: Vergence and power	
1.1 Conjugacy, object space and image space	
1.2 Sign convention	
1.3 Spherical refracting surface	
1.4 Spherical mirror; catoptric power	
1.5 Cardinal points	
1.6 Magnification	
1.7 Light and visual function	
1.8 Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism	
1.9 Aberration and application Spherical and Chromatic	
Unit-2 Optics of Ocular Structure	8 hour

2.1 Cornea and aqueous 2.2 Crystalline lens 2.3 Vitreous 2.4 Schematic and reduced eye	
Unit-3 Measurements of Optical Constants of the Eye 3.1 Corneal curvature and thickness 3.2 Keratometry 3.3 Curvature of the lens and ophthalmophakometry 3.4 Axial and axis of the eye 3.5 Basic Aspects of Vision. 3.5.1 Visual Acuity 3.5.2 Light and Dark Adaptation 3.5.3 Color Vision 3.5.4 Spatial and Temporal Resolution 3.5.5 Science of Measuring visual performance and application to Clin	8 hour
Unit-4 Refractive anomalies and their causes 4.1 Etiology of refractive anomalies 4.2 Contributing variability and their ranges	8 hour
Unit-5 Populating distributions of anomalies.. 4.4 Optical component measurements 4.5 Growth of the eye in relation to refractive errors	8 hour

Continuous Assessment Pattern

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

Name of The Course	OPTOMETRIC OPTICS - I			
Course Code	BOP303			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

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

Course Outcomes

CO1	Student should acquire skill and knowledge on measurement of lens power, lens centration using conventional techniques
CO2	Student should able to perform the transpositions, knowledge to verify different forms of lenses
CO3	student should acquire knowledge on selecting the tools for power grinding process
CO4	student should acquire knowledge on decentration and effects, units, base- apex notation, compounding and resolving prisms
CO5	student should acquire knowledge on lens designs- single vision, bifocals, progressive lenses
CO6	student should acquire knowledge on lens designs- single vision, bifocals, progressive lenses

Text Book

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

Reference Book (s)

- 1 Ophthalmic Dispensing, Second edition, ButterworthHeinemann, USA, 1996

Course Content

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

9. Magnification in high plus lenses, Minification in high minus lenses	
Unit-5 Lens anomalies.. Tilt induced power in spectacles Aberration in Ophthalmic Lenses	8 hour
Unit-6 effect of optical aberration on image quality and visual performance compensating effects of aberration high index lenses	

Continuous Assessment Pattern

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

Name of The Course	OPTOMETRIC INSTRUMENTS			
Course Code	BOP304			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	To understand and generalise the scope and importance of different ophthalmic instruments and appliances
CO2	To explain and demonstrate the functioning and applications in different diseases
CO3	To be able to practice with ophthalmic instruments
CO4	To get operationalize with the detailed knowledge which helps to examine the corneal diseases
CO5	To get operationalize with the detailed knowledge which helps in examine the retinal diseases
CO6	To get detailed knowledge about recent advancements in Optometric instruments.

Text Books

- 1 David Henson: Optometric Instrumentations, Butterworth- Heinemann, UK, 1991

Reference Books

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

Course Content

<p>Unit I: Refractive instruments Optotypes, Test charts standards. Choice of test charts Trial case lenses Refractor (phoropter) head units Optical considerations of refractor units Trial frame design Near vision difficulties with units and trial frames Retinoscope – types available Adjustment of Retinoscopes- special features Projection charts Illumination of the consulting room. Brightness acuity test</p>	8 hours
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Vision analyzer Pupilometer Potential Acuity Meter Abberometer	
Unit II: Retinoscope Design of retinoscope, Ophthalmoscopes and related devices Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing Ophthalmoscope disc Filters for ophthalmoscopy Indirect ophthalmoscope	8 hours
Unit III: Instruments Lensometer, Lens gauges or clock Slit lamp Tonometers Keratometer and corneal topography Refractometer, fundus camera	8 hours
Unit IV : Orthoptic Instruments Orthoptic Instruments (Synaptophore Only) Color Vision Testing Devices Fields of Vision And Screening Devices Scans ERG, External eye photography	8 hours
Unit V: Perimetry Perimeter, Exophthalmometer, specular microscopy	8 hours
UNIT: VI Recent advancements in Optometric instruments	
Ocular Coherence Tomography	
Gonioscopy	
A scan	
B scan	

Continuous Assessment Pattern

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

Name of The Course	OCULAR DISEASES - I			
Course Code	BOP305			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	students should understand the etiology and etiology of refractive errors and the correlation with ocular diseases
CO2	students should able to differentiate between signs and symptom inorder to reach to the diagnosis
CO3	students shoould able to understand the course sequence of ocular diseases
CO4	students should understand the diagnostic approach to make the final diagnosis
CO5	students should able to understand the management of ocular diseases
CO6	Student should be able to analyse and demonstrate recent advancements in Ocular Disease

Text Books

- 1 Clinical Ophthalmology a systamatic approach by Jack J kanski 8th edition
- 2 A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books

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

Course Content

Unit I: Orbit	8 hours
1.1 Orbit Anatomy & Physiology	
1.2 Proptosis (Classification, Causes, Investigations)	
1.3 Enophthalmos	
1.4 Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)	
1.5 Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)	
1.6 Grave's Ophthalmopathy	
1.7 Orbital tumors(Dermoids, capillary haemangioma, Optic nerve glioma)	
1.8 Orbital blowout fractures	

1.9 Orbital surgery (Orbitotomy) 1.10 Orbital tumors 1.11 Orbital trauma 1.12 Orbital complications & their Management	
Unit II: Lid 1 Lid Anatomy & Physiology 2.2 Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos) 2.3 Oedema of the eyelids(Inflammatory, Solid, Passive edema) 2.4 Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion ,Internalhordeolum, Molluscum Contagiosum) 2.5 Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis). 2.6 Tumors (Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)	8 hours
Unit III: Lacrimal System & Conjunctiva Lacrimal System Anatomy & Physiology 3.2 Tear Film 3.3 The Dry Eye (Sjogren's Syndrome) 3.4 The watering eye (Etiology, clinical evaluation) 3.5 Dacryocystitis 3.6 Swelling of the Lacrimal gland(Dacryoadenitis) 4 Conjunctiva 4.1Conjunctiva Anatomy & Physiology 4.2 Inflammations of conjunctiva (Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis) 4.3 Degenerative conditions(Pinguecula, Pterygium, Concretions) 4.4 Symptomatic conditions(Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration) 4.5 Cysts and Tumors	8 hours
Unit IV : Cornea Cornea Anatomy and Physiology 5.2 Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea) 5.3 Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative 5.4 Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic)) 5.5 Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration) 5.6 Dystrophies (Reis Buckler dystrophy,Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy) 5.7 Keratoconus, Keratoglobus 5.8 Corneal oedema, Corneal opacity, Corneal vascularisation 5.9 Penetrating Keratoplasty	8 hours
Unit V: Uveal Tract and Sclera Anatomy and Physiology of Uvea 6.2 Uveitis 6.3 Etiology 6.4 Pathology 6.5 Anterior Uveitis 6.6 Posterior Uveitis 6.7 Purulent Uveitis 6.8 Endophthalmitis	8 hours

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

UnitVI: Recent Advancements in Ocular Disease hours Recent advancements in Ocular Diseases Recent advancements in diagnosis of Ocular Diseases Recent advancements in management of Ocular Disease Literature review U tube videos Presentations	8
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Continuous Assessment Pattern

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

Name of The Course	CLINICAL EXAMINATION OF VISUAL SYSTEM			
Course Code	BOP306			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Students should be able to understand the purpose of setup and requirements
CO2	students should be able to understand the devices and the method of handling
CO3	students should be able to understand the indications and contraindications of the test
CO4	studetns should able to coorelate the step by step procedure and way of documentation of the findings
CO5	students should able to coorealte the interpretation of the findings od the various clinical optometry procedures

Text Books

- 1 Clinical Ophthalmology a systamatic approach by Jack J kanski 8th edition
- 2 A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books

- 3 Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- 4 D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- 5 J .B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991

Course Content

Unit I Introduction History taking Visual acuity estimation Extraocular motility, Cover teat, Alternating cover test Hirschberg test, Modified Krimsky Pupils Examination	8 hours
Unit II: Various test Maddox Rod Van Herrick External examination of the eye, Lid Eversion Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),	8 hours
Unit III: Binocular function test	8 hours

Color Vision Stereopsis Confrontation test Photostress test	
Unit IV : Eye examinations Slit lamp biomicroscopy Ophthalmoscopy Tonometry ROPLAS	8 hours
Unit V: Miscellaneous test Amsler test Contrast sensitivity function test Saccades and pursuit test	8 hours

Continuous Assessment Pattern

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

Name of The Course	INDIAN MEDICINE AND TELEMEDICINE			
Course Code	BOP307			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:
This course insight into existing healthcare system in India.

Course Outcomes

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

CO1	Students should be able to aware of traditional health care systems
CO2	students should be able to aware of latest healthcare systems
CO3	students should get the basic knowledge about the telemedicine practices in india
CO4	students should able to understand the traditional treatment methods
CO5	students should able to coorelate the treatment of ocular diseases using telemedicine with ocular refractive anamolies

Text Books

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

Reference Books

- 1 D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- 2 J .B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991

Course Content

Unit I Introduction to healthcare delivery system	8 hours
Healthcare delivery system in India at primary, secondary and tertiary care Community participation in healthcare delivery system Health system in developed countries. Private Sector National Health Mission National Health Policy Issues in Health Care Delivery System in India National Health Programme-Background, action plan, targets, operations, achievements and constraints in various National Heath Programme.	
Unit II: Introduction to AYUSH system of medicine	8 hours
Introduction to Ayurveda. Yoga and Naturopathy Unani Siddha Homeopathy	

Need for integration of various system of medicine	
Unit III: Health scenario of India	8 hours
Health scenario of India- past, present and future Demography & Vital Statistics- Demography – its concept Vital events of life & its impact on demography Significance and recording of vital statistics Census & its impact on health policy	
Unit IV : Epidemiology	8 hours
Principles of Epidemiology Natural History of disease Methods of Epidemiological studies	
Unit V: Miscellaneous topics	8 hours
Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.	

Continuous Assessment Pattern

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

Name of The Course	COMPUTER FUNDAMENTALS			
Course Code	BOP308			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcomes

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

CO1	Students should be able to appreciate the role of computer technology
CO2	Students should be able to gain hand-on experience in using computers
CO3	Students should get the basic knowledge about the computer technologies in india
CO4	Students should able to understand the Concept behind it
CO5	Students should able to utilise knowledge in treatment of Eye
CO6	Students should able to utilise knowledge about recent advancements in Computer technologies

Text Books

- 1 Computer Technology. Joney & Bartlett learning, 2014

Reference Books

- 1 Computers fundamentals, Lippincott Williams and Wilkins,1991

Course Content

<p>Unit I Introduction 8 hours</p> <p>1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.</p> <p>2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).</p> <p>3. Processor and memory: The Central Processing Unit (CPU), main memory.</p>
<p>Unit II: Introduction to Storage Device 8 hours</p> <p>Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.</p> <p>5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).</p>
<p>Unit III: Introduction to MS-Word 8 hours</p> <p>Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.</p>

7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
Unit IV : Introduction to power-point: 8 hours Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs. 9. Introduction of Operating System: introduction, operating system concepts, types of operating system. 10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network
Unit V: Internet and its Applications 8 hours Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet. 12. Application of Computers in clinical settings.

Continuous Assessment Pattern

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

Name of The Course	VISUAL OPTICS LAB-I			
Course Code	BOPT351			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives

The objective of this course is to

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

Course Outcomes

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

CO1	Students will able to understand the fundamental of optical components of eye
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TEXT BOOK:

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

REFERENCE BOOKS:

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

List of Experiments

- 1 To study and understand the electromagnetic spectrum
- 2 To study and understand the nature of visible light
- 3 To study about different wave phenomena of eye
- 4 To study and understand about interference
- 5 To study and understand about diffraction
- 6 To study and understand about polarization
- 7 To study and understand about fluorescence and phosphorescence
- 8 To study and understand about resolving power of the eye

Continuous Assessment Pattern

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

Name of The Course	OPTOMETRIC INSTRUMENTS LAB			
Course Code	BOPT352			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives

The objective of this course is to

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

Course Outcomes

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

CO1	student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments
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TEXT BOOK:

1 David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

REFERENCE BOOKS:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002

2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

List of Experiments

- 1 To perform the calibration of optometric instrument and appliances of lensometer
- 2 To study and perform the experiment of optometric instrument and appliances of tonometer
- 3 To study and perform the experiment of optometric instrument and appliances of slitlamp
- 4 To study and perform the experiment of optometric instrument and appliances of colour vision tests
- 5 To study and perform the experiment of optometric instrument and appliances of placido disc
- 6 To study and perform the experiment of optometric instrument and appliances of keratometer
- 7 To study and perform the experiment of optometric instrument and appliance of retinoscopy

Continuous Assessment Pattern

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

Name of The Course	OCULAR DISEASE LAB-I			
Course Code	BOP353			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives

The objective of this course is to

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

Course Outcomes

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

CO1	Students should able to understand the etiology, Epidemiology, signs, Symptoms, ocular sequence, diagnostic approach and management of ocular diseases
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TEXT BOOK:

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

REFERENCE BOOKS:

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

List of Experiments

- 1 Diagnosis & management of orbital diseases
- 2 Diagnosis & management of Eyelid & Eye lashes diseases
- 3 Diagnosis & management of lacrimal diseases(Tears & Canal)
- 4 Diagnosis & management of conjunctival Disease(Bacterial, Fungal, Viral, Protozoa, Helminth)
- 5 Diagnosis & management of conjunctival Disease(Pinguecula & Pterigium)
- 6 Diagnosis & management of corneal disease
- 7 Diagnosis & management of scleritis and episcleritis
- 8 Diagnosis & management of Aqueous Humor disease
- 9 Diagnosis & management of Cataract

Continuous Assessment Pattern

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

Name of The Course	COMPUTER FUNDAMENTALS LAB			
Course Code	BOP354			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

The objective of the course is to:

The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

Course Outcomes

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

CO1	The students will be able to appreciate the role of computer technology and some extent able to gain hand-on experience in using computers.
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Text Books

1 Computer Technology. Joney & Bartlett learning, 2014

Reference Books

1 Computers fundamentals, Lippincott Williams and Wilkins,1991

List of Experiments

- 1 Introduction to computer:
- 2 Introduction to . Input output devices
- 3 Introduction to Storage Devices:
- 4 Introduction to MS-Word
- 5 Introduction to power-point
- 6 Introduction to Internet and its Applications

Continuous Assessment Pattern

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

Name of The Course	OPTOMETRIC OPTICS II & DISPENSING OPTICS			
Course Code	BOP401			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

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

Course Outcomes

CO1	Students should understand about the instruments and the procedure for processing lenses before fitting
CO2	Students should able to differentiate between different types of lenses
CO3	Students should able to understand the frame measurements and essential fitting measurements
CO4	Students should able to understand the process of quality check and trouble shooting
CO5	Students should understand the different types of tints and different selective lenses
CO6	Students should understand about recent advancements in Optometric Optics & dispensing

Text Book

- 1 Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
- 2 Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996

Reference Book (s)

- 1 Ophthalmic Dispensing, Second edition, ButterworthHeinemann, USA, 1996
- 2 Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

Course Content

Unit-1 Spectacle Lenses - II:	8 hours
Manufacture of glass	
<ul style="list-style-type: none"> • Lens materials • Lens surfacing • Principle of surface generation and glass cements • Terminology used in Lens workshop • Lens properties • Lens quality • Faults in lens material • Faults on lens surface • Methods of Inspecting the quality of lenses • Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others) 	
Spectacle Frames:	
<ul style="list-style-type: none"> • Types and parts • Classification of spectacle frames-material, weight, temple position, Coloration • Frame construction • Frame selection • Size, shape, mounting and field of view of ophthalmic lenses 	

<p>Tinted & Protective Lenses</p> <ul style="list-style-type: none"> • Characteristics of tinted lenses Absorptive Glasses • Polarizing Filters, Photochromic & Reflecting filters • Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses 	
<p>Unit-2 Multifocal Lenses:</p> <p>Introduction, history and development, types</p> <ul style="list-style-type: none"> • Bifocal lenses, Trifocal & Progressive addition lenses <p>Reflection from spectacle lens surface & lens coatings:</p> <ul style="list-style-type: none"> • Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line • Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating <p>Miscellaneous Spectacle:</p> <ul style="list-style-type: none"> • Iseikonic lenses • Spectacle magnifiers • Recumbent prisms • Fresnel prism and lenses • Lenticular &Aspherical lenses • High Refractive index glasses 	8 hour
<p>Unit-3 Spectacle</p> <ol style="list-style-type: none"> 1. Components of spectacle prescription & interpretation, transposition, Add and near power relation 2. Frame selection –based on spectacle prescription, professional requirements, age group, face shape 3. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height 4. Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt 	8 hour
<p>Unit-4 Optical devices</p> <p>Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)</p> <ol style="list-style-type: none"> 6. Neutralization –Hand &lensometer, axis marking, prism marking 7. Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction) 8. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit 	8 hour
<p>Unit-5 Spectacle repair</p> <p>Spectacle repairs –tools, methods, soldering, riveting, frame adjustments</p> <ol style="list-style-type: none"> 10. Special types of spectacle frames <ul style="list-style-type: none"> ➤ Monocles ➤ Ptosis crutches ➤ Industrial safety glasses ➤ Welding glasses 12. Frame availability in Indian market 13. FAQ’s by customers and their ideal answers 	8 hour
<p>Unit-6 Recent Advancement Dispensing Optician</p> <p>Raising the standards and profile of the optician profession across the globe</p> <p>New technologies and diagnostic tools in Optometry</p>	8 hour

Continuous Assessment Pattern

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

Name of The Course	VISUAL OPTICS - II			
Course Code	BOP402			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives:

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

Course Outcomes

CO1	Students should be able to understand the fundamentals of optical components of the eye
CO2	Student should able to gain the theoretical knowledge on the measurement of visual acuity
CO3	Student should be able to coorelate the skill on visual acuity measurement
CO4	Student should able to understand the objective clinical refraction
CO5	Students should able to understand the subjective clinical refraction

Text Book

- 1 A H Tunnaclyffe: Visual optics, The Association of British Optician, 1987
- 2 Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996
- 3 AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006

Reference Book (s)

- 1 M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
- 2 Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth – Heinemann, 2002
- 3 WJ Benjamin: Borish’s clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006
- 4 HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.

Course Content

Unit-1 Accommodation & Presbyopia	8 hours
Far and near point of accommodation	
<input type="checkbox"/> Range and amplitude of accommodation	
<input type="checkbox"/> Mechanism of accommodation	
<input type="checkbox"/> Variation of accommodation with age	
<input type="checkbox"/> Anomalies of accommodation	
<input type="checkbox"/> Presbyopia	
<input type="checkbox"/> Hypermetropia and accommodation	
Unit-2 Convergence:	8 hour
Type, Measurement and Anomalies	

<input type="checkbox"/> Relationship between accommodation and convergence-AC/A ratio	
Unit-3 Objective Refraction Streak retinoscopy <input type="checkbox"/> Principle, Procedure, Difficulties and interpretation of findings <input type="checkbox"/> Transposition and spherical equivalent <input type="checkbox"/> Dynamic retinoscopy various methods <input type="checkbox"/> Radical retinoscopy and near retinoscopy <input type="checkbox"/> Cycloplegic refraction	8 hour
Unit-4 Subjective Refraction <input type="checkbox"/> Principle and fogging <input type="checkbox"/> Fixed astigmatic dial(Clock dial),Combination of fixed and rotator dial(Fan and block test),J.C.C <input type="checkbox"/> Duochrome test <input type="checkbox"/> Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging <input type="checkbox"/> Binocular refraction-Variou techniques	8 hour
Unit-5 Effective Power & Magnification <input type="checkbox"/> Ocular refraction vs. Spectacle refraction <input type="checkbox"/> Spectacle magnification vs. Relative spectacle magnification <input type="checkbox"/> Axial vs. Refractive ametropia, Knapp's law	8 hour

Continuous Assessment Pattern

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

Name of The Course	OCULAR DISEASES -II			
Course Code	BOPT403			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Students should understand the etiology and etiology of refractive errors and the correlation with ocular diseases
CO2	Students should able to differentiate between signs and symptom in order to reach to the diagnosis
CO3	Students should able to understand the course sequence of ocular diseases
CO4	Students should understand the diagnostic approach to make the final diagnosis
CO5	Students should able to understand the management of ocular diseases
CO6	Students should able to understand about recent advancements in anterior segment ocular diseases

Text Book

- 1 Clinical Ophthalmology a systematic approach by Jack J kanski 8th edition
- 2 A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books

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

Course Content

Unit I: Retina and Vitreous:	8 hours
<input type="checkbox"/> Applied Anatomy <input type="checkbox"/> Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery) <input type="checkbox"/> Inflammatory disorders (Retinitis : Acute purulent , Bacterial, Virus, mycotic) <input type="checkbox"/> Retinal Vasculitis (Eales's) <input type="checkbox"/> Retinal Artery Occlusion (Central retinal Artery occlusion) <input type="checkbox"/> Retinal Vein occlusion (Ischaemic, Non Ischaemic , Branch retinal vein occlusion) <input type="checkbox"/> Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations	

<input type="checkbox"/> Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration. <input type="checkbox"/> Retinal Detachment: Rhegmatogenous, Tractional, Exudative) <input type="checkbox"/> Retinoblastoma <input type="checkbox"/> Diabetic retinopathy	
Unit II: Ocular Injuries Terminology : Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury) <input type="checkbox"/> Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis) <input type="checkbox"/> Non Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational) <input type="checkbox"/> Clinical approach towards ocular injury patients	8 hours
Unit III: Lens <input type="checkbox"/> Applied Anatomy and Physiology <input type="checkbox"/> Clinical examination <input type="checkbox"/> Classification of cataract <input type="checkbox"/> Congenital and Developmental cataract <input type="checkbox"/> Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic) <input type="checkbox"/> Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar. <input type="checkbox"/> Management of cataract (Non-surgical and surgical measures; preoperative evaluation, Types of surgeries,) <input type="checkbox"/> Complications of cataract surgery <input type="checkbox"/> Displacement of lens: Subluxation, Displacement <input type="checkbox"/> Lens coloboma, Lenticonus, Microspherophakia.	8 hours
Unit IV : Clinical Neuro-ophthalmology <input type="checkbox"/> Anatomy of visual pathway <input type="checkbox"/> Lesions of the visual pathway <input type="checkbox"/> Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robertson pupil, Adie's tonic pupil) <input type="checkbox"/> Optic neuritis, Anterior Ischemic optic neuropathy, Pappilloedema, optic atrophy • Cortical blindness <input type="checkbox"/> Malingering <input type="checkbox"/> Nystagmus <input type="checkbox"/> Clinical examination	8 hours
Unit V: Glaucoma <input type="checkbox"/> Applied anatomy and physiology of anterior segment <input type="checkbox"/> Clinical Examination <input type="checkbox"/> Definitions and classification of glaucoma <input type="checkbox"/> Pathogenesis of glaucomatous ocular damage <input type="checkbox"/> Congenital glaucoma's <input type="checkbox"/> Primary open angle glaucoma <input type="checkbox"/> Ocular hypertension <input type="checkbox"/> Normal Tension Glaucoma <input type="checkbox"/> Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) <input type="checkbox"/> Secondary Glaucoma's <input type="checkbox"/> Management : common medications, laser intervention and surgical techniques	8 hours
Unit VI: Recent Advancements in Ocular diseases <input type="checkbox"/> Recent advancements in Ocular diseases <input type="checkbox"/> Recent advancements in Ocular diseases diagnostic techniques <input type="checkbox"/> Recent advancements in Ocular diseases management	8 hours

Continuous Assessment Pattern

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

Name of The Course	PATHOLOGY			
Course Code	BOP404			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Students should understand difference between an infection and inflammation
CO2	students should able to aquire knowledege on signs and associated syptoms exhibited by different disease conditions
CO3	students should able to understand the pathology of specific infections of the systemic health
CO4	students should understand the circulatory distrubences associated with different disease conditions
CO5	students should able to understand the body immunity and allergies associated with immune breakdown

Text Book

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

Reference Books

2. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
3. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.

Course Content

Unit I: INFECTION Inflammation and repair Infection in general	8 hours
Unit II: Specific Infection Tuberculosis Leprosy Syphilis Fungal infection Viral chlamydial infection	8 hours
Unit III: □ Neoplasia Haematology Anemia Leukemia	8 hours

Bleeding disorders.	
Unit IV : Circulatory disturbances	8 hours
Thrombosis	
Infarction	
Embolism	
Clinical pathology	
Interpretation of urine report	
Interpretation of blood smears.	
Unit V: Immune system	8 hours
<input type="checkbox"/> Immune system	
Shock, Anaphylaxis.	
Allergy	

Continuous Assessment Pattern

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

Name of The Course	BASIC AND OCULAR PHARMACOLOGY			
Course Code	BOP405			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	Students should understand the basic principles of pharmacokinetics and pharmacodynamics
CO2	students should able to acquire knowledge on types of ocular drugs and their mechanisms
CO3	students should able to understand the indications and contraindications of ocular drugs
CO4	students should understand the drug dosage and routes of administration
CO5	students should acquire the knowledge on adverse effects

Text Book

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996

Reference Books

1. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

Course Content

Unit I: General Pharmacology	8 hours
General Pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factors modifying drug actions	
Unit II: Systemic Pharmacology	8 hours
Autonomic nervous system: Drugs affecting pupillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Antihypertensive and drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, General & local anaesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy – Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants	
Unit III: Ocular Pharmacology	8 hours
Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology	
Unit IV : Diagnostic Test	8 hours
Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedures, Anti-glaucoma drugs;	
Unit V: Pharmacotherapy of ocular infections	8 hours
Bacterial, viral, fungal & chlamydial; Drugs used in allergic, inflammatory & degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes ,Antioxidants .	

Continuous Assessment Pattern

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

Name of The Course	INTRODUCTION TO QUALITY PATIENT, SAFETY & MEDICAL PSYCHOLOGY			
Course Code	BOP406			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:

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

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

Course Outcomes

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

CO1	Students gain the introductory knowledge about quality and patient safety from indian prespectives
CO2	students would gather knowledge various aspects of medical psychology
CO3	students should coorelate and apply in the clinical scenario during the clinical postings
CO4	students should understand the ethics and safety aspects of clinical postings
CO5	students should able to coorelate the basic clinical knowledge with medical psychology

Text Book

- 1 Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013

Reference Books

- 2 Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013

Course Content

Unit I: Quality assurance and management	8 hours
Quality assurance and management Basics of emergency care and life support skills	
Unit II: Waste Management	8 hours
Biomedical waste management and environment safety Infection and prevention control	
Unit III: Ocular Pharmacology	8 hours
Antibiotic resistance Disaster preparedness and management	
Unit IV : Psychology	8 hours
Intelligence Learning, Memory, Personality, Motivation Body Integrity – one's body image The patient in his Milen	

The self-concept of the therapist, Therapist-patient relationship – some guidelines Illness, its impact on the patient
Unit V: Medical Psychology 8 hours
Maladies of the age and their impact on the patient's own and others concept of his body image Adapting changes in Vision Why Medical Psychology demands commitment?.

Continuous Assessment Pattern

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

Course Name	Optometric Optics-II & Dispensing Optics (P)			
Course Code	BOP451			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives:

Skills and knowledge to be acquired on right selection of frame and right selection of ophthalmic lens and delivery management

Course Outcomes

CO1	Skills and knowledge to be acquired on right selection of frame and right selection of ophthalmic lens and delivery management
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Text Book (s)

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

Reference Book (s)

1. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

List of Experiments

- 1) Experiment to understand the functions of various optometric instruments available in trial set
- 2) Experiment to analyse and evaluate the dioptric power of the spherocylindrical ophthalmic lens using Manual crossed-line tangent lensometer
- 3) Experiment to evaluate and quantify binocular PD
- 4) Experiment to evaluate and quantify the near PD
- 5) Experiment to measure the monocular PD using a sample frame
- 6) Experiment to measure subjectively checking sag height
- 7) Experiment to measure objectively checking sag height equality
- 8) Experiment to analyse and quantify the fitting height in case of a progressive lens
- 9) Experiment to analyse and quantify the Major reference point for a progressive lens

Continuous Assessment Pattern

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

Name of The Course	VISUAL OPTICS II - PRACTICAL			
Course Code	BOP452			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	Students should able to understand the fundamental of optical components of eye and to gain knowledge and practical skills on visual acuity measurement, objective and subjective clinical refraction
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Text Book (s)

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
2. AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006
3. George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002
4. Duke –Elder’s practice of Refraction
5. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth - Heinemann, 2007

Reference Book (s)

1. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002
2. Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth – Heinemann, 2002
3. WJ Benjamin: Borish’s clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

List of Experiments	
1	Experiment to find out the normative NPC and NPA
2	Experiment to understand the method of dynamic retinoscopy
3	Experiment to understand the static retinocopy
4	Experiment to understand procedure and method of duochrome test
5	Experiment to understand the procedure for ocular refraction
6	Experiment to understand the procedure for spectacle refraction
7	Experiment to understand the procedure and method of cycloplegic refraction
8	Experiment to understand the principle, purpose and procedure of fogging

Continuous Assessment Pattern

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

Name of The Course	OCULAR DISEASES II- PRACTICAL			
Course Code	BOP453			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	Students should able to acquire knowledge on etiology,epidemiology,symptoms,signs and diagnosis of various ocular diseases
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Text Book (s)

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

Reference Book (s)

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
2. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007
- 3.

List of Experiments	
1	Experiment to understand the procedure and investigation of retinal diseases
2	Experiment to understand the procedure and management of mechanical injuries
3	Experiment to understand the procedure and management of non mechanical injuries
4	Experiment to understand the procedure and clinical examination of cataract
5	Experiment to understand the procedure and clinical examination of clinical neuro-ophthalmology
6	Experiment to demonstrate techniques to findout malingering
7	Experiment to determine and measure the degree of Strabismus

Continuous Assessment Pattern

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

Name of The Course	BASIC AND OCULAR PHARMACOLOGY - PRACTICAL			
Course Code	BOP454			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	Students should acquire a knowledge on basic principles of pharmacokinetics and pharmacodynamics, drug dosage, indications, contraindications and adverse effects
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Text Book (s)

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996

Reference Book (s)

1. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

List of Experiments	
1	Experiment to understand the procedure for installing cycloplegics and to see the effect of cycloplegics
2	Experiment to understand the procedure for installing mydriatics and see the effect of mydriatics
3	Experiment to understand the procedure for installing fluorescence dye and see the observe the uses of installing fluorescence dye in clinical set up
4	Experiment to understand the calibration and disinfection procedure for tonometer
5	Experiment to understand the calibration and disinfection of optometric devices
6	Experiment to understand various ways of disinfection of hands in clinical procedure

Continuous Assessment Pattern

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

Name of The Course	Contact Lens-1			
Course Code	BOP501			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

Course Outcomes

CO1	Explain and enlist the important properties of contact lenses
CO2	Explain and summarise the contact lens design for various kinds patients
CO3	Explain and recognize various types of fitting
CO4	Explain all the procedures patient
CO5	Explain and identify and manage the adverse effects of contact lens
CO6	Explain and identify recent advancements in contact lens

Text Book (s)

IACLE modules 1 – 10

CLAO Volumes 1, 2, 3

Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006

Reference Book (s)

E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

Unit-1 Introduction	6 hours
1. Introduction to Contact lenses 1.1 Definition 1.2 Classification / Types 2. History of Contact Lenses 3. Optics of Contact Lenses 3.1 Magnification & Visual field 3.2 Accommodation & Convergence 3.3 Back & Front Vertex Power / Vertex distance calculation 4. Review of Anatomy & Physiology of 4.1 Tear film 4.2 Cornea 4.3 Lids & Conjunctiva	
Unit-2	8 hours

5. Introduction to CL materials 5.1 Monomers, Polymers 6. Properties of CL materials 6.1 Physiological (Dk, Ionicity, Water content) 6.2 Physical (Elasticity, Tensile strength, Rigidity) 6.3 Optical (Transmission, Refractive index) 7. Indications and contraindications 8. Parameters / Designs of Contact Lenses & Terminology	
Unit-3	9 hours
9. RGP Contact Lens materials 10. Manufacturing Rigid and Soft Contact Lenses – various methods 11. Pre-Fitting examination – steps, significance, recording of results 12. Correction of Astigmatism with RGP lens 13. Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses 14. Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses	
Unit-4	8 hours
15. Calculation and finalising Contact lens parameters 16. Ordering Rigid Contact Lenses – writing a prescription to the Laboratory 17. Checking and verifying Contact lenses from Laboratory 18. Modifications possible with Rigid lenses 19. Common Handling Instructions 19.1 Insertion & Removal Techniques 19.2 Do's and Dont's	
Unit-5	9 hours
20. Care and Maintenance of Rigid lenses 20.1 Cleaning agents & Importance 20.2 Rinsing agents & Importance 20.3 Disinfecting agents & importance 20.4 Lubricating & Enzymatic cleaners 21. Follow up visit examination 22. Complications of RGP lenses	
Unit-6	
<ul style="list-style-type: none"> • Rose K lenses • Ortho K lenses • Therapeutic lenses • Anti-bacterial contact lenses • Drug delivery contact lenses 	
Augmented reality contact lenses	

Continuous Assessment Pattern

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

Name of The Course	LOW VISION CARE			
Course Code	BOP502			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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

Course Outcomes

CO1	Students should understand the basic low vision clinical set up.
CO2	Students should be able to understand the clinical examination of low vision subjects
CO3	Student should be able to understand the optical, electronic and assistive devices
CO4	students should able to understand trainng of low vision subjects and assistive devices
CO5	Students should able to understand the making refferals and followup cases of low vision subject

Text Book (s) Christine Dickinson, Low Vision, 4th edition,

Reference Book (s) Vision 2020 manual for Low vision

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

Continuous Assessment Pattern

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

Name of The Course	GERIATRIC & PAEDIATRIC OPTOMETRY			
Course Code	BOP503			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

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

Course Outcomes

CO1	Student should able to identify, investigate the age related changes in the eyes
CO2	Student should be able to counsel the elderly and able to dispense spectacles with proper instruction
CO3	student should be knowledgeable on common ocular disease
CO4	Have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues
CO5	Be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus

Text Book (s)

A.J. ROSSENBLOOM Jr & M.W.MORGAN: Vision and Aging, ButterworthHeinemann, Missouri, 2007.
 Pediatric Optometry - JEROME ROSNER, Butterworth, London 1982
 Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004
 DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

Reference Book (s)

Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis, 1980.

Course Content:

Unit-1 Introduction	6 hours
1. Structural, and morphological changes of eye in elderly 2. Physiological changes in eye in the course of aging. 3. Introduction to geriatric medicine – epidemiology, need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebro-vascular disease, Diabetes, COPD) 4. Optometric Examination of the Older Adult 5. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye	
Unit-2	8 hours

6. Contact lenses in elderly 7. Pharmacological aspects of aging 8. Low vision causes, management and rehabilitation in geriatrics. 9. Spectacle dispensing in elderly – Considerations of spectacle lenses and frames	8 hours
Unit-3	
1. The Development of Eye and Vision 2. History taking Paediatric subjects 3. Assessment of visual acuity 4. Normal appearance, pathology and structural anomalies of 4.1 Orbit, Eye lids, Lacrimal system, 4.2 Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil 4.3 Lens, vitreous, Fundus Oculomotor system 5. Refractive Examination	9 hours
Unit-4	
6. Determining binocular status 7. Determining sensory motor adaptability 8. Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia 9. Remedial and Compensatory treatment of Strabismus and Nystagmus 10. Paediatric eye disorders : Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics	8 hours
Unit-5	
11. Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism 12. Spectacle dispensing for children 13. Paediatric contact lenses 14. Low vision assessment in children	

Continuous Assessment Pattern

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

Name of The Course	BINOCULAR VISION -I			
Course Code	BOP504			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

Course Outcomes

CO1	will be able demonstrate an in-depth knowledge of the gross anatomy relating the extraocular muscles.
CO2	will be able demonstrate an in-depth knowledge of the gross physiology relating the extraocular muscles.
CO3	will be able demonstrate and Provide a detailed explanation of, and differentiate between the etiology and investigation of binocular vision anomalies.
CO4	will be able demonstrate provide a detailed explanation of the management of binocular vision anomalies.
CO5	will be able demonstrate and adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.
CO6	will be able demonstrate and about recent advancements in binocular vision anomalies

Text Book (s)

Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.

Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd

Gunter K. V. Mosby Company

Reference Book (s)

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

Unit-1 Introduction	6 hours
1. Binocular Vision and Space perception. 1.1 Relative subjective visual direction. 1.2 Retino motor value 1.3 Grades of BSV 1.4 SMP and Cyclopean Eye 1.5 Correspondence, 1.6 Fusion, Diplopia, Retinal rivalry 1.7 Horopter 1.8 Physiological Diplopia and Suppression 1.9 Stereopsis, Panum's area, BSV. 1.10 Stereopsis and monocular clues - significance. 1.11 Egocentric location, clinical applications. 1.12 Theories of Binocular vision. 2. Anatomy of Extra Ocular Muscles.	

2.1 Rectii and Obliques, LPS. 2.2 Innervation & Blood Supply.	
Unit-2	8 hours
3. Physiology of Ocular movements. 3.1 Center of rotation, Axes of Fick. 3.2 Action of individual muscle. 4. Laws of ocular motility 4.1 Donder's and Listing's law 4.2 Sherrington's law 4.3 Hering's law 5. Uniocular & Binocular movements - fixation, saccadic & pursuits. 5.1 Version & Vergence. 5.2 Fixation & field of fixation	
Unit-3	8 hours
6. Near Vision Complex Accommodation 6.1 Definition and mechanism (process). 6.2 Methods of measurement. 6.3 Stimulus and innervation. 6.4 Types of accommodation. 6.5 Anomalies of accommodation – aetiology and management. 7. Convergence 7.1 Definition and mechanism. 7.2 Methods of measurement. 7.3 Types and components of convergence - Tonic, accommodative, fusional, proximal. 7.4 Anomalies of Convergence – aetiology and management.	
Unit-4	9hours
8. Sensory adaptations 8.1 Confusion 9. Suppression 9.1 Investigations 9.2 Management 9.3 Blind spot syndrome 10. Abnormal Retinal Correspondence 10.1 Investigation and management 10.2 Blind spot syndrome	
Unit-5	8 hours
11. Eccentric Fixation 11.1 Investigation and management 12. Amblyopia 12.1 Classification 12.2 Aetiology 12.3 Investigation 12.4 Management	
Unit-6 13.1 Recent advances in Binocular Vision 13.2 Vision therapy and the recent trend 13.3 Neuro-optometry, a glimpse	8 hours

Continuous Assessment Pattern

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

Name of The Course	SYSTEMIC DISEASES			
Course Code	BOP505			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

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

Course Outcomes

CO1	Students should be able to understand the common systemic conditions
CO2	Students should be knowledgeable about the definitions of systemic diseases
CO3	students should be knowledgeable about diagnostic approach of systemic diseases
CO4	Students should be able to understand complications and managemnt of systemic diseases
CO5	students should ne able to understand ocular findings and systemic conditions of systemic diseases
CO6	students should be able to understand about recent advancements in systemic diseases

Text Book (s)

C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002

Reference Book (s)

Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999

Unit-1 Introduction	6 hours
Hypertension Definition, classification, Epidemiology, clinical examination, complications, and management. Hypertensive retinopathy Diabetes Mellitus Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications Diabetic Retinopathy Thyroid Disease Physiology, testing for thyroid disease, Hyperthyroidism, Hypothroidism, Thyroiditis, Thyroid tumors Grave’s Ophthalmopathy Acquired Heart Disease	

Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm Ophthalmic considerations	
Unit-2	8 hours
Cancer : Incidence Etiology Therapy Ophthalmologic considerations Connective Tissue Disease Rheumatic arthritis Systemic lupus erythematosus Scleroderma Polymyositis and dermatomyositis Sjogren syndrome Behcet's syndrome Eye and connective tissue disease Tuberculosis Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.	
Unit-3	9 hours
Herpes virus (Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus) Herpes and the eye Hepatitis (Hepatitis A, B, C) Acquired Immunodeficiency Syndrome Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations) Common Tropical Medical Ailments Malaria Typhoid Dengue Filariases Onchocerciasis Cysticercosis Leprosy	
Unit-4	8 hours
Nutritional and Metabolic disorders: Obesity Hyperlipidaemias Kwashiorkor Vitamin A Deficiency Vitamin D Deficiency Vitamin E Deficiency Vitamin K Deficiency Vitamin B1,B2, Deficiency Vitamin C Deficiency Myasthenia Gravis First Aid General Medical Emergencies Preoperative precautions in ocular surgeries	
Unit-5	9 hours

Psychiatry Basic knowledge of psychiatric condition and Patient Management Genetics Introduction to genetics Organisation of the cell Chromosome structure and cell division Gene structure and basic principles of Genetics. Genetic disorders and their diagnosis. Genes and the eye Genetic counseling and genetic engineering.
Unit-6 8 hours
Advancements in Systemic Diseases Advances in Drug Delivery Systems for Treating Ocular Complications of Systemic Diseases Advances in systemic lupus erythematosus ECHOCARDIOGRAPHY IN SYSTEMIC DISEASE

Continuous Assessment Pattern

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

Name of The Course	RESEARCH METHODOLOGY AND BIOSTATISTICS			
Course Code	BOP506			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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

Course Outcomes

CO1	Students should be able understand the reseach designs
CO2	students should be able to do the literature review for the hypothesis generation
CO3	students should acquire a knowledge on statistical analysis
CO4	students should able to understand the methods to prove the hypothesis
CO5	students should able to understand sample size determination

Text Book (s)

Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., W. B. Saunders Co.

Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.

Reference Book (s)

Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

Unit-1 Introduction	6 hours
Research Methodology Introduction to research methods Identifying research problem Ethical issues in research Research design	
Unit-2	8 hours
Types of Data Research tools and Data collection methods Sampling methods Developing a research proposal	
Unit-3	9 hours
Biostatistics Basics of Biostatistics Introduction of Biostatistics Measures of Morality Sampling	

Statistical significance Correlation	
Unit-4	8 hours
Sample size determination. Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion. Theoretical distributions. Binomial Normal Sampling –necessity of methods and techniques. Chi. Square test (2 x 2)	
Unit-5	9 hours
Hospital Statistics Use of computerized software for statistics	

Continuous Assessment Pattern

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

Name of The Course	Universal human values and ethics			
Course Code	LLL101			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they 'really want to be' in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To facilitate the students to understand harmony at all the levels of human living, and live accordingly.
5. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

Course Outcomes:

On completion of this course, the students will be able to

CO1	Understand the significance of value inputs in a classroom and start applying them in their life and profession
CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
CO3	Understand the value of harmonious relationship based on trust and respect in their life and profession
CO4	Understand the role of a human being in ensuring harmony in society and nature
CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
CO6	To understand about latest advancements in area of Universal human values and ethics

Text Book (s)

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

Reference Book (s)

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
5. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.

6. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
 7. A N Tripathy, 2003, Human Values, New Age International Publishers.
 8. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) KrishiTantraShodh, Amravati.
 9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
 10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
 11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
- B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

<p>Unit-1 Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 8 hours</p> <ol style="list-style-type: none"> 1. Understanding the need, basic guidelines, content and process for Value Education 2. Self-Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario 6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels
<p>Unit-2 Understanding Harmony in the Human Being - Harmony in Myself 8 hours</p> <ol style="list-style-type: none"> 1. Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’ 2. Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha 3. Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer) 4. Understanding the characteristics and activities of ‘I’ and harmony in ‘I’ 5. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of physical needs, meaning of Prosperity in detail 6. Programs to ensure Sanyam and Swasthya
<p>Unit-3 Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship 10 hours</p> <ol style="list-style-type: none"> 1. Understanding harmony in the Family- the basic unit of human interaction 2. Understanding values in human-human relationship; meaning of <i>Nyaya</i> and program for its fulfilment to ensure <i>Ubhay-tripti</i>; Trust (<i>Vishwas</i>) and Respect (<i>Samman</i>) as the foundational values of relationship 3. Understanding the meaning of <i>Vishwas</i>; Difference between intention and competence

4. Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
5. Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
6. Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family!

**Unit-4 Understanding Harmony in the Nature and Existence - Whole existence as Co-existence
7 hours**

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
3. Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
4. Holistic perception of harmony at all levels of existence

**Unit-5 Implications of the above Holistic Understanding of Harmony on Professional Ethics
7 hours**

1. Natural acceptance of human values
2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. Competence in Professional Ethics:
 - a) Ability to utilize the professional competence for augmenting universal human order,
 - b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models
5. Case studies of typical holistic technologies, management models and production systems
6. Strategy for transition from the present state to Universal Human Order:
 - a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
 - b) At the level of society: as mutually enriching institutions and organizations

Unit-6 Recent advancements in area of Universal human values and ethics 8 hrs

Continuous Assessment Pattern

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

Name of The Course	CONTACT LENS-I PRACTICAL			
Course Code	BOP551			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Outcomes

CO1	Students should be able to understand the handling of contact lens. They should be able to teach and counsel the patient on maintenance of contact lens
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Text Book (s)

IACLE modules 1 – 10 CLAO Volumes 1, 2, 3

Reference Book (s)

Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004

List of Experiments	
1	Experiment to analyse and quantify the corneal curvature using keratometer
2	Quantitative Measurement Of Tears Using Schirmers Test
3	Experiment to assess the tear prism height by doing a Non-Invasive method
4	Experiment to assess the tear film break up time and tear thinning time by doing a Non-Invasive method
5	Experiment to assess the insertion and removal of a soft contact lens
6	Experiment to assess the soft contact lens fitting using slit lamp examination
7	Experiment to assess the insertion and removal of a RGP contact lens
8	Experiment to assess the fit assessment of a gas permeable lens

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
30	00	70	100

Name of The Course	LOW VISION AIDS & VISUAL REHABILITATION (PRACTICAL)			
Course Code	BOP552			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Outcomes

CO1	students should be able to understand dispensing and counselling regarding the optical and non optical devices for low vision subjects
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Text Book (s)

Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998

Sarika G, Sailaja MVSE Vaithilingam: practice of Low vision –A guide book, Medical Research Foundation, 2015.

Reference Book (s)

Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999

List of Experiments	
1	Attending in low vision care clinic and history taking.
2	Determining the type of telescope and its magnification (Direct comparison method & calculated method)
3	Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.
4	Inducing visual impairment and prescribing magnification.
5	Determining reading speed with different types of low vision aids with same magnification.
6	Determining reading speed with a low vision aid of different magnifications.
7	Experiment to assess the central visual field using Amsler chart

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Test (MTE)	End Term Test (ETE)	Total Marks
30	00	70	100

Name of The Course	BINOCULAR VISION – I Practical			
Course Code	BOP553			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	Students should able to adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely
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Text Book (s) :

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Gunter K. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

List of Experiments	
1	Experiment to understand the optics, parts of synaptophore
2	Experiment to perform test for fusion using synaptophore
3	Experiment to perform tests for Simultaneous macular perception
4	Experiment to perform test for Stereopsis using synaptophore
5	Experiment to perform Worth's 4 dot test
6	Experiment to perform Red filter test
7	Experiment to perform bagolini straiated glasses
8	Experiment to perform 4 prism base out test
9	Experiment to perform TNO random dot test

Continuous Assessment Pattern

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

Name of The Course	VISION TECHNICIAN I PRACTICAL			
Course Code	BOVT554			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

CO1	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.
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Text Book (s) :

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

List of Experiments

1	Preparation of a plan for primary eye care center in community
2	How to take visual acuity
3	Role of vision technician at different level s of health care system
4	How to calibrate optical struments
5	Primary eye care examination of a patient
6	Diagnosis and management of a patient
7	Diagnosis and management of patient with blurry vision
8	Diagnosis and management of patient with asthenopia
9	Diagnosis and management of patient with red eye
10	First aid in general and ocular patient

Continuous Assessment Pattern

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

Name of The Course	Contact lens – II			
Course Code	BOP601			
Prerequisite	Ocular anatomy & physiology, Geometrical and physical optics			
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

Course Outcomes

CO1	Explain and enlist the important properties of contact lenses
CO2	Explain summarise the contact lens design for various kinds patients
CO3	Explain and recognize various types of fitting
CO4	Explain all the procedures patient
CO5	Explain and identify and manage the adverse effects of contact lens
CO6	Explain and identify about recent advancements in contact lens

Text Book (s) :

- 1) IACLE modules 1 – 10
- 2) CLAO Volumes 1, 2, 3

Reference Book (s)

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

Unit-1	8 Hours
1. SCL Materials & Review of manufacturing techniques	
2. Comparison of RGP vs. SCL	
3. Pre-fitting considerations for SCL	
Unit-2	8 Hours
4. Fitting philosophies for SCL	
5. Fit assessment in Soft Contact Lenses: Types of fit – Steep, Flat, Optimum	
6. Calculation and finalising SCL parameters	
6.1 Disposable lenses	
6.2 Advantages and availability	
Unit-3	8 Hours
7. Soft Toric CL	
7.1 Stabilization techniques	
7.2 Parameter selection	
7.3 Fitting assessment	
8. Common Handling Instructions	
8.1 Insertion & Removal Techniques	
8.2 Do's and Dont's	
9. Care and Maintenance of Soft lenses	
9.1 Cleaning agents & Importance	

9.2 Rinsing agents & Importance 9.3 Disinfecting agents & importance 9.4 Lubricating & Enzymatic cleaners	
Unit-4	8 Hours
10. Follow up visit examination 11. Complications of Soft lenses 12. Therapeutic contact lenses 12.1 Indications 12.2 Fitting consideration	
Unit-5	8 Hours
13. Specialty fitting 13.1 Aphakia 13.2 Pediatric 13.3 Post refractive surgery 14. Management of Presbyopia with Contact lenses	
Unit: 6 Recent Advancements in Contact lens Cosmetic contact lenses Prosthetic contact lenses Scleral and semi sclera lenses Market availability of contact lenses	6 Hours

Continuous Assessment Pattern

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

Name of The Course	Binocular vision – II			
Course Code	BOP602			
Prerequisite	Ocular anatomy, Ocular physiology, Geometrical and physical optics			
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

Course Outcomes

CO1	will be able demonstrate an in-depth knowledge of the gross anatomy relating the extraocular muscles.
CO2	will be able demonstrate an in-depth knowledge of the gross physiology relating the extraocular muscles.
CO3	will be able demonstrate and Provide a detailed explanation of, and differentiate between the etiology and investigation of binocular vision anomalies.
CO4	will be able demonstrate provide a detailed explanation of the management of binocular vision anomalies.
CO5	will be able demonstrate and adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.
CO6	Students should able to know about recent advancements in Binocular Vision

Text Book (s) :

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Gunter K. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

Unit-1	8 Hours
1. Neuro-muscular anomalies 1.1 Classification and etiological factors 2. History – recording and significance. 3. Convergent strabismus 3.1 Accommodative convergent squint 3.1.1 Classification 3.1.2 Investigation and Management 3.2 Non accommodative Convergent squint 3.1.3 Classification 3.1.4 Investigation and Management	
Unit-2	8 hours
4. Divergent Strabismus 4.1 Classification 4.2 A & V phenomenon 4.3 Investigation and Management 5. Vertical strabismus	

5.1 Classification	
5.2 Investigation and Management	
6. Paralytic Strabismus	
6.1 Acquired and Congenital	
6.2 Clinical Characteristics	
Unit-3	8 hours
7. Distinction from comitant and restrictive Squint	
8. Investigations	
8.1 History and symptoms	
8.2 Head Posture 8.3 Diplopia Charting	
8.4 Hess chart	
8.5 PBCT	
8.6 Nine directions	
8.7 Binocular field of vision	
Unit-4	8 Hours
9. Amblyopia and Treatment of Amblyopia	
10. Nystagmus	
11. Non-surgical Management of Squint	
Unit-5	8 hours
12. Restrictive Strabismus	
12.1 Features	
12.2 Musculo-fascical anomalies	
12.3 Duane’s Retraction syndrome	
12.4 Clinical features and management	
12.5 Brown’s Superior oblique sheath syndrome	
12.6 Strabismus fixus	
12.7 Congenital muscle fibrosis	
13. Surgical management	
Unit 6:	6 hours
Recent advancements of Binocular vision	
New treatments and therapies of binocular vision	
Journals and article discussion in the domain of Binocular vision	

Continuous Assessment Pattern

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

Name of The Course	PUBLIC HEALTH AND COMMUNITY OPTOMETRY			
Course Code	BOP603			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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

Course Outcomes

CO1	Student should understand about community based eye care in india
CO2	Student should acquire knowledge on prevalence of various eye diseases
CO3	Students should aware of developing information education communication materials on eye and vision care for the benefit of the public
CO4	Students should able to organize health education programmes in the community
CO5	Students should able to perform vision screening for various eye diseases in the community and for different age groups

Text Book (s) :

- GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002
- CLAO Volumes 1, 2, 3 Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980

Reference Book (s) :

- K Park: Park's Text Book of Preventive and Social Medicine, 19th edition, Banarsidas Bhanot publishers, Jabalpur, 2007

Course Content:

Unit-1	8 hours
Public Health Optometry: Concepts and implementation, Stages of diseases Dimensions, determinants and indicators of health Levels of disease prevention and levels of health care patterns Epidemiology of blindness – Defining blindness and visual impairment Eye in primary health care	
Unit-2	8 hours
Contrasting between Clinical and community health programs Community Eye Care Programs Community based rehabilitation programs Nutritional Blindness with reference to Vitamin A deficiency	
Unit-3	8 hours
Vision 2020: The Right to Sight Screening for eye diseases National and International health agencies, NPCB Role of an optometrist in Public Health	
Unit-4	8 hours

Organization and Management of Eye Care Programs – Service Delivery models Health manpower and planning & Health Economics Evaluation and assessment of health programmes
Unit-5 8 hours
Optometrists role in school eye health programmes Basics of Tele Optometry and its application in Public Health Information, Education and Communication for Eye Care programs

Continuous Assessment Pattern

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

Name of The Course	PRACTICE MANAGEMENT, MEDICAL LAW AND ETHICS			
Course Code	BOP604			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives: This course deal with all aspects of optometry practice management – business, accounting, taxation, professional values, and quality & safety aspects.

Course Outcomes

CO1	student should gain knowledge on various aspects of private optometric practice from indian perspective
CO2	student should aquire knowledge on ethical condiserations to be taken beforing treating the patient
CO3	student should understand the medical laws which are build to safeguard the patient care
CO4	student should able to understand the safety aspects
CO5	students should aquire knowledge on accounting, taxation ,professional values and quality and safety aspects.

Unit-1 Business Management: Practice establishment and development Stock control and costing Staffing and staff relations Business computerization
Unit-2 Accounting Principles Sources of finance Bookkeeping and cash flow Taxation and taxation planning
Unit-3 Professionalism and Values Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality Personal values- ethical or moral values Attitude and behaviour- professional behaviour, treating people equally Code of conduct , professional accountability and responsibility, misconduct Differences between professions and importance of team efforts Cultural issues in the healthcare environment
Unit-4 Few of the important and relevant topics that need to focus on are as follows: Medical ethics - Definition - Goal - Scope b Introduction to Code of conduct Basic principles of medical ethics –Confidentiality Malpractice and negligence - Rational and irrational drug therapy Autonomy and informed consent - Right of patients
Unit-5 Care of the terminally ill- Euthanasia

Organ transplantation

Medico legal aspects of medical records –Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

Professional Indemnity insurance policy

Development of standardized protocol to avoid near miss or sentinel events

. Obtaining an informed consent

Continuous Assessment Pattern

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

Name of The Course	OCCUPATIONAL OPTOMETRY			
Course Code	BOP605			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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

Course Outcomes

CO1	Student should able aquire knowledge on effects of physical, chemical and other hazards on eye and vision
CO2	To identify occupational causes of visual and eye problems
CO3	To be able to prescribe suitable corrective lenses and eye protective wear
CO4	To set visual requirements,standards for different jobs
CO5	should able to aquire knowledge on visual requirements of various professions

Text Book (s) :

1. PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's text book of Occupational optometry. 1st edition, Published by Elite School of optometry , unit of Medical Research Foundation, Chennai, India , 2015
2. R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001
3. Gunter K. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular VisionHeterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

Reference Book (s)

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

Course Content:

Unit-1
Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. 1.1 Acts and Rules - Factories Act, WCA, ESI Act Electromagnetic Radiation and its effects on Eye
Unit-2
Light – Definitions and units, Sources, advantages and disadvantages, standards Color – Definition, Color theory, Color coding, Color defects, Color Vision test
Unit-3
Occupational hazards and preventive/protective methods

Task Analysis
Unit-4
Industrial Vision Screening – Modified clinical method and Industrial Vision test Vision Standards – Railways, Roadways, Airlines
Unit-5
Visual Display Units Contact lens and work

Continuous Assessment Pattern

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

Name of The Course	VISION TECHNICIAN – II			
Course Code	BOV606			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

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

CO1	Demonstrate knowledge and understanding about the role of Vision technician in the healthcare settings
CO2	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.
CO3	Demonstrate safe handling of devices and positioning of patient for measurement of visual acuity
CO4	Demonstrate ability to guide & educate patient on relevant information under the guidance or supervision of ophthalmologist.
CO5	Demonstrate bio medical waste management.
CO6	Demonstrate Knowledge about recent advancements in optometry.

Text Book (s) :

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

Reference Book (s)

1. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
2. Grosvenor: Primary Care Optometry, 4th edition, Butterworth –heinemann, USA, 2002
3. David Henson: Optometric Instrumentations, Butterworth- Heinemann, UK, 1991

Course Content:

Unit-1	8 hours
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 occluder and pinhole
- To be able to instill mydriatic or cycloplegic drops or ointments as indicated

Unit-2**8 hours****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

Unit-3**8 hours****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:

<ul style="list-style-type: none"> • Understand the need to follow organization policies and procedures • Understand techniques to remove spills in accordance with policies and procedures of the organization 	
Unit-4	8 hours
<p>Observing And Reporting: Understand the importance of observing and reporting before, during & after procedure</p> <ul style="list-style-type: none"> • Understanding the importance of timely information to the appropriate authority in case of routine and emergency situations. <p>Infection Control Measures - Policies and Procedures:</p> <ul style="list-style-type: none"> • 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 <p>Confidentiality, Documentation & Records:</p> <ul style="list-style-type: none"> • 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 	
Unit-5	8 hours
<p>Professional Behaviour In Healthcare Setting:</p> <ul style="list-style-type: none"> • 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 <p>Basic Computer Knowledge:</p> <ul style="list-style-type: none"> • 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 	
Unit-6	8 hours
<p>Recent Advancements in field of Vision Technician:</p> <ul style="list-style-type: none"> • Recent Advancements in field of Vision Technician • Recent Advancements in field of Diagnostics • Recent Advancements in field of Ocular therapeutics • Market trends in Field of Vision Technician 	

Continuous Assessment Pattern

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

Name of The Course	Contact lens – II Practical			
Course Code	BOP651			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	student should able to understand the handling of contact lens. They should be able to teach and counsel the patient on maintainance of contact lens
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Text Book (s) :

- 1 IACLE modules 1 – 10
- 2 CLAO Volumes 1, 2, 3
- 3 Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006
- 4 Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004

List of Experiments	
1	Experiment to assess the base curve of a contact lens using keratometry
2	Experiment to calculate the total diameter of contact lens using a HVID
3	Experiment to assess the tightness of contact lens using pushpup test
4	Experiment to evaluate the procedure to check the static fitting
5	Experiment to evaluate the procedure to check dynamic fitting
6	Experiment to counsel a neophyte user of contact lens
7	Experiment to counsel on insertion of contact lens
8	Experiment to counsel on removal of contact lens
9	Experiment to evaluate the over refraction of contact lens
10	Experiment to check the followup visit examination of contact lens user

Continuous Assessment Pattern

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

Name of The Course	BINOCULAR VISION II PRACTICAL			
Course Code	BOP652			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

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

Course Outcomes

CO1	Students should able to adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely
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Text Book (s) :

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
3. Gunter K. V. Mosby Company
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

List of Experiments	
1	Experiment to understand the hess chart
2	Experiment to perform Diplopia charting
3	Experiment to perform test PBCT
4	Experiment to perform Nine Gaze directions
5	Experiment to perform Worth's 4 dot test
6	Experiment to perform Red filter test
7	Experiment to perform bagolini straiated glasses
8	Experiment to perform 4 prism base out test
9	Experiment to perform TNO random dot test

Continuous Assessment Pattern

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

Name of The Course	VISION TECHNICIAN LAB-II			
Course Code	BOV653			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	4	2

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

CO1	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.
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Text Book (s) :

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

List of Experiments	
1	Describe different manpower in ophthalmic team & their role.
2	Duties & responsibilities of vision technician .
3	Prepare a plan for examination a)examination format b)illumination c)sop d)distance e)calibration
4	Prepare a plan of history taking for eye OPD.
5	Use your clinical skill to assess various types of refractive error.
6	Describe objective and subjective refraction.
7	Preparing a patient record and prescripton format.
8	Preparing a patient instruction format.
9	How to assess patient for visual field.
10	How to assist an ophthalmologist in operation theater.
11	Describe the factor that cause hospital acquired infection importance of hand wash.
12	Describe vital parameters and how to control abnormalities.

13	Describe & enlist personal protective equipment & their use.
14	Explain professional behavior & describe optometry oaths.

Continuous Assessment Pattern

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

Name of The Course	Project- Contact lens			
Course Code	BOP653			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	4	2

Course Outcomes

CO1	Students will be able to acquire knowledge on Clinical research, advancements in the field of Contact lenses
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Text Book (s) IACLE Module 1-10 **CR Kothari, Research methodology**
Reference Book (s) CLAO 1-3 volume

Unit-1 Introduction	8 hours
Introduction to Contact lenses Definition Types of Contact lenses Insertion and removal of Contact lenses	
Unit-2	8 hours
Indication and contraindication Parameters Selection of lenses in different conditions	
Unit-3	8 hours
What is clinical research Need of research for evidence based practices search engine for literature review	
Unit-4	8 hours
Method and methodology for research Inclusion and exclusion criteria to be fixed	
Unit-5	8 hours
Hypothesis testing Statistical analysis using softwares Step by step writing guidance	

Continuous Assessment Pattern

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

Name of The Course	Project- Binocular Vision			
Course Code	BOP654			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	4	2

Course Outcomes

CO1	Students will be able to acquire knowledge on Clinical research, advancements, recent trends, Therapies in the field of Binocular Vision
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Text Book (s) IACLE Module 1-10 CR Kothari, Research methodology
Reference Book (s) CLAO 1-3 volume

Unit-1 Introduction	8 hours
List of all the BV instruments Principle of the instruments The basic optometric set up for Vision therapies	
Unit-2	8 hours
The comparison between different modes of therapies Amblyopia, Suppression Synoptophore, VTS	
Unit-3	8 hours
The need of clinical research Sensitivity and specificity of outcome Finding out the problem statement	
Unit-4	8 hours
Formulating hypothesis Methodology to be adopted and the set up required	
Unit-5	8 hours
Statistical analysis Discussion on the basis of literature review Abstract and conclusion, publication	

Continuous Assessment Pattern

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

Name of The Course	Project- Optometric Instruments			
Course Code	BOP655			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	4	2

Course Outcomes

CO1	Students will be able to acquire knowledge on Clinical research, advancements in the field of Optometric Instruments
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Text Book (s) IACLE Module 1-10

CR Kothari, Research methodology

Reference Book (s)

CLAO 1-3 volume

Unit-1 Introduction	8 hours
List of all the instruments Principle of the instruments The basic optometric set up	
Unit-2	8 hours
The comparison between devices with similar functions Inter-instrument variability The diagnostic devices in Optometry	
Unit-3	8 hours
The need of clinical research Sensitivity and specificity of a device in measurement Finding out the problem statement	
Unit-4	8 hours
Formulating hypothesis Methodology to be adopted and the set up required	
Unit-5	8 hours
Statistical analysis Discussion on the basis of literature review Abstract and conclusion, publication	

Continuous Assessment Pattern

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

Name of The Course	CLINICAL INTERNSHIP INCLUDING RESEARCH PROJECT WORK				
Course Code	BOP701				
Prerequisite					
Corequisite					
Antirequisite					
	L	T	P	J	C
	0	0	0	40	20

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)

1. J Boyd Eskridge, John F Amos, 'Clinical procedures in Optometry'

Reference Book (s)

2. C R Kothari, 'Research Methodology'

Unit-1	Introduction and Orientation	8 hours
-	<ol style="list-style-type: none"> 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	Clinical procedures in Optometry	8 hours
	<ol style="list-style-type: none"> 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	Clinical Research	8 hours
	<ol style="list-style-type: none"> 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	Research Methodology and Ethical approval	8 hours
	<ol style="list-style-type: none"> 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	Publication and outcome	8 hours
	<ol style="list-style-type: none"> 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 RESEARCH PROJECT WORK			
Course Code	BOPT801			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P J	C
	0	0	040	20

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)

1. J Boyd Eskridge, John F Amos, ‘ Clinical procedures in Optometry’

Reference Book (s)

2. C R Kothari, ‘Research Methodology’

Unit-1	Introduction and Orientation	8 hours
	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	Clinical procedures in Optometry	8 hours
	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	Clinical Research	8 hours
	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	Research Methodology and Ethical approval	8 hours
	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	Publication and outcome	8 hours
	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