GALGOTIAS UNIVERSITY

Syllabus of

Bachelor of Optometry

Name of School: School of Medical & Allied Sciences

Department: Paramedical and Allied Health Sciences

Year: 2019-2023

School of Medical and Allied Sciences

GALGOTIAS UNIVERSITY

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

Program: B. Optometry

Scheme: 2019 – 2023

Course Curriculum

Semester I									
Sl. No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT1001	General Anatomy	3	0	0	3	10	20	70
2	BOPT1002	General Physiology	3	0	0	3	10	20	70
3	BOPT1003	Basic & Ocular Biochemistry	3	0	0	3	10	20	70
4	BOPT1004	Geometrical Optics-1	3	0	0	3	10	20	70
5	BOPT1005	Nutrition	2	0	0	2	10	20	70
6	ENVS1001	Energy & Environmental Sciences	3	0	0	3	10	20	70
7	FENG1001	Functional English-I	3	0	0	3	10	20	70
8	BOPT1051	General Anatomy Lab	0	0	2	1	30	-	70
9	BOPT1052	General Physiology Lab	0	0	2	1	30	--	70
10	BOPT1053	Basic & Ocular Biochemistry Lab	0	0	2	1	30	-	70
11	BOPT1054	Geometrical Optics Lab-1	0	0	2	1	30	-	70
12	FENG1002	Functional English Lab-I	0	0	2	1	30	-	70
		Total Credit	**20**	**0**	**10**	**25**			
Semester II									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT2001	Ocular Anatomy	3	0	0	3	10	20	70
2	BOPT2002	Ocular Physiology	3	0	0	3	10	20	70
3	BOPT2003	Physical Optics	3	0	0	3	10	20	70
4	BOPT2007	Geometrical Optics-II	3	0	0	3	10	20	70
5	FENG1003	Functional English-II	3	0	0	3	10	20	70
6	BOPT2051	Ocular Anatomy Lab	0	0	2	1	30	-	70
7	BOPT2052	Ocular Physiology Lab	0	0	2	1	30	-	70
8	BOPT2053	Physical optics Lab	0	0	2	1	30	-	70
9	BOPT2054	Geometrical Optics Lab-II	0	0	2	1	30	-	70
10	FENG1004	Functional English Lab-II	0	0	2	1	30	-	70
		Total Credit	**15**	**0**	**10**	**20**			

Semester III									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1.	BOPT3001	Ocular Microbiology	2	0	0	2	10	20	70
2.	BOPT3002	Visual Optics-I	2	0	0	2	10	20	70
3.	BOPT3003	Optometric Optics-I	3	0	0	3	10	20	70
4.	BOPT3004	Optometric Instruments	2	0	0	2	10	20	70
5.	BOPT3005	Ocular Disease-1	3	0	0	3	10	20	70
6.	BOPT3006	Clinical Examination of Visual system	2	0	0	2	10	20	70
7.	BOPT3007	Indian Medicine & Telemedicine	2	0	0	2	10	20	70
8.	COMP1111	Computer Fundamentals	3	0	0	3	10	20	70
9.	BOPT3051	Visual Optics Lab-I	0	0	2	1	30	-	70
10.	BOPT3052	Optometric Instruments Lab-I	0	0	2	1	30	-	70
11.	BOPT3053	Ocular Disease Lab-1	0	0	2	1	30	-	70
12.	COMP1112	Computer Fundamentals Lab	0	0	2	1	30	-	70
		Total Credit	**19**	**0**	**8**	**23**			

Semester IV									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1.	BOPT4001	Optometric Optics-II & Dispensing Optics	3	0	0	3	10	20	70
2.	BOPT4002	Visual optics-II	2	0	0	2	10	20	70
3.	BOPT4003	Ocular Disease-II	3	0	0	3	10	20	70
4.	BOPT4004	Pathology	2	0	0	2	10	20	70
5.	BOPT4005	Basic & Ocular Pharmacology	3	0	0	3	10	20	70
6.	BOPT4006	Introduction to Quality Patient, Safety & Medical Psychology	3	0	0	3	10	20	70
8.	BOPT4051	Optometric Optics-II & Dispensing Optics Lab	0	0	2	1	30	-	70
9.	BOPT4052	Visual Optics Lab-II	0	0	2	1	30	-	70
10.	BOPT4053	Ocular Disease Lab-II	0	0	2	1	30	-	70
11.	BOPT4054	Basic & Ocular Pharmacology Lab	0	0	2	1	30	-	70
		Total Credit	**16**	**0**	**8**	**20**			

Semester V									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1.	BOPT5001	Contact lens-I	3	0	0	3	10	20	70
2.	BOPT5002	Low Vision Care	2	0	0	2	10	20	70

3.	BOPT5003	Geriatric & Paediatric Optometry	3	0	0	3	10	20	70
4.	BOPT5004	Binocular Vision-I	3	0	0	3	10	20	70
5.	BOPT5005	Systemic Disease	3	0	0	3	10	20	70
6.	BOPT5006	Research Methodology & Biostatistics	2	0	0	2	10	20	70
7.	LLLL1001	Universal human Values & Ethics	3	0	0	3	10	20	70
8.	BOVT5007	Vision Technician-I	5	0	0	3	10	20	70
9.	BOPT5051	Contact lens Lab-I	0	0	2	1	30	-	70
10.	BOPT5052	Low Vision Care Lab	0	0	2	1	30	-	70
11.	BOPT5053	Binocular Vision Lab-I	0	0	2	1	30	-	70
12.	BOVT5054	Vision Technician Lab-I	0	0	4	2	30	-	70
		Total Credit	**16**	**0**	**10**	**27**			

Semester VI

Sl No	**Course Code**	**Name of the Course**					**Assessment Pattern**		
			L	**T**	**P**	**C**	**IA**	**MTE**	**ETE**
1.	BOPT6001	Contact lens-II	3	0	0	3	10	20	70
2.	BOPT6002	Binocular Vision -II	3	0	0	3	10	20	70
3.	BOPT6003	Public Health & Community Optometry	2	0	0	2	10	20	70
4.	BOPT6004	Practice Management, Medical Law & Ethics	2	0	0	2	10	20	70
5.	BOPT6005	Occupational Optometry	2	0	0	2	10	20	70
6.	BOVT6006	Vision Technician-II	5	0	0	3	10	20	70
7.	BOPT6051	Contact lens Lab-II	0	0	2	1	30	-	70
8.	BOPT6052	Binocular Vision Lab–II	0	0	2	1	30	-	70
9.	BOVT6053	Vision Technician Lab-II	0	0	4	2	30	-	70
		Total Credit	**17**	**0**	**8**	**19**			

Semester VII

Sl No	**Course Code**	**Name of the Course**					**Assessment Pattern**		
			L	**T**	**P**	**C**	**IA**	**MTE**	**ETE**
1.	BOPT7001	Clinical Internship Including Research Project Work	0	0	40	20	30	-	70
		Total	**0**	**0**	**40**	**20**			

Semester VIII

Sl No	**Course Code**	**Name of the Course**					**Assessment Pattern**		
			L	**T**	**P**	**C**	**IA**	**MTE**	**ETE**
1.	BOPT8001	Clinical Internship Including Research Project Work	0	0	40	20	30	-	70
		Total	**0**	**0**	**40**	**20**			

List of Electives

Basket-1 Semester-II

Sl. No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT2004	Infection Control Measures	2	0	0	2	10	20	70
2	BOPT2005	Operation theatre Management	2	0	0	2	10	20	70
3	BOPT2006	Hospital Waste Management	2	0	0	2	10	20	70

Basket-2 Semester-IV

Sl. No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT4007	Biostatistics	3	0	0	3	10	20	70
2	BOPT4008	Health care organisation	3	0	0	3	10	20	70
3	BOPT4009	Applied Psychology	3	0	0	3	10	20	70

Basket-3 SemesterVI

Sl No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT6007	Hospital Management	2	0	0	2	10	20	70
2	BOPT6008	Clinic & Shop Management	2	0	0	2	10	20	70
3	BOPT6009	PHC & Eye Camp management	2	0	0	2	10	20	70

Basket-4 SemesterVI

Sl No	Course Code	Name of the Electives					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	BOPT6053	Contact lens	0	0	4	2	30		70
2	BOPT6054	Binocular Vision	0	0	4	2	30		70
3	BOPT6055	Optometric Instruments	0	0	4	2	30		70

Name of The Course	General Anatomy-I			
Course Code	BOPT1001			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

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

Course Outcomes:

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

Text Books

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

Reference Books

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

Course Content

Unit I 8 Hrs

- Introduction and concepts
- Terminologies

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

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
10	20	70	100

Name of The Course	General Physiology-I			
Course Code	BOPT1002			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

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

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

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

Text Books

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

Reference Books

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

Course Content:

Unit I 8 Hrs **Cell** Definition, Structure and function of Cytoplasmic Organelles, Reproduction-Meosis, Mitosis.
Unit II 8 Hrs **The important physico-chemical laws applied to physiology** Diffusion, Osmosis, Bonding, Filtration, Dialysis, Surface Tension, Adsorption, Colloid.
Unit III 8 Hrs **Introduction- composition and function of blood** Red blood cells- Erythropoiesis, stages of differentiation function, counts physiological Variation. Haemoglobin -Structure, function, concentration physiological variation. Methods of

Estimation of Hb, White blood cell- Production, function, life span, count, differential count. Platelets- Origin, normal count, morphology functions. Plasma Proteins- Production, concentration, types, albumin, globulin, fibrinogen, Prothrombin functions. Haemostasis & Blood coagulation. Haemostasis – Definition, normal haemostasis, clotting factors, mechanism of clotting disorders of clotting factors. Blood Bank, Blood groups- A, B, O system, Rh system,
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** **R**ecent 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
10	20	70	100

Name of The Course	Basic & Ocular Biochemistry			
Course Code	BOPT1003			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To understand the basic biochemistry.

Course Outcomes

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

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

Text Books

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

Reference Books:-

1. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990

2. D.R. Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

Course Content

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

Unit IV	8 Hrs
Vitamins: General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)	
Unit V	8 Hrs
Minerals: Na, K, Ca, P, Fe, Cu and Se(requirements, availability and properties) Mode of Evaluation: The theory and lab performance of students are evaluated separately	
Unit VI	**8Hrs**
Recent Advancement in Basic & Ocular Biochemistry	

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-I			
Course Code		BOPT1004			
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 propogation in a variety of medias
CO2	Pheonomenon of reflection and refraction of light at boundaries between media and subseqent 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. 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.

Course Content

Unit I: . Nature of light **8 hours**

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

Unit II: Glass **8 hours**

9 Glass slab; displacement without deviation; displacement without dispersion
10. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism
11. Prisms; angular dispersion; dispersive power; Abbe's number.
12. Definition of crown and flint glasses; materials of high refractive index
13. Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index
14. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula
15. Paraxial approximation; derivation of vergence equation
16. Imaging by a positive powered surface and negative powered surface
.

Unit III: Vergence **8 hours**

17. Vergence at a distance formula; effectivity of a refracting surface
18. Definition of a lens as a combination of two surfaces; different types of lens shapes.
19. Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths
20. Newton's formula; linear magnification; angular magnification
21. Nodal Planes.
22. Thin lens as a special case of thick lens; review of sign convention
23. Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
24. Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions

Unit IV : Prentice's Rule **8 hours**

. Prentice's Rule
26. System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.
27. System of more than two thin lenses; calculation of equivalent power using magnification formula
28. Vergence and vergence techniques revised.
29. Gullstrand's schematic eyes, visual acuity, Stile Crawford
30. Emmetropia and ametropia
31. Blur retinal Imaginary
32. Correction of spherical ammetropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptoric power, angular magnification of spectacles in aphakic
.

Unit V: Thin lens model of the eye **8 hours**

33. Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.
34. Aperture stops- entrance and exit pupils.
35. Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.
36. Accommodation –Accommodation formulae and calculations.
37. Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.
38. Spatial distribution of optical information- modulation transfer functions- Spatial filtering- applications.
39. Visual optics of aphakia and pseudophakia.

Unit 6: Recent Advancements in Geometrical Optics

- 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
10	20	70	100

Name of The Course	Nutrition			
Course Code	BOPT1005			
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 Niranjan 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

Energy

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.

Unit II: Protein **8 hours**

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.

Unit III: Fat **8 hours**

Fats

Sources and functions

Essential fatty acids

Excess and deficiency

Lipids and the eye.

Hyperlipidemia, heart diseases, atherosclerosis. Minerals

General functions and sources

Macro and micro minerals associated with the eye.

Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)

Unit IV : Vitamin **8 hours**

Vitamins

General functions, and food sources

Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A

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
10	**20**	**70**	**100**

Name of The Course	Energy and Environmental Sciences			
Course Code	ENVS1001			
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
10	20	70	100

Name of The Course	**Functional English- I**				
Course Code	**FENG1001**				
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: Communication **8 hours**

- Communication: Definition, Types (Verbal and Non-verbal), Models, Language as a tool of communication
- The flow of Communication, Communication Networks
- Barriers to Communication

• Professional Communication
Unit II: Professional Communication **8 hours** • Features of professional communication • Importance of Business/Technical Communication
Unit III: Word Formation **8 hours** • Word Formation • Basic sentence structure Common Errors: Subject- Verb agreement, prepositions, Articles, Place of adverb, Consistency of tenses.
Unit IV : Paragraph **8 hours** • Paragraph Writing: Methods, unity and coherence Reading Skills: Types, Strategies, Barriers,
Unit V: Official Communication **9 hours** • Official Communication: Letter, Memo, Agenda and Minutes of meeting, notice and circular, and email Job Application

Continuous Assessment Pattern

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

Name of The Course	GENERAL ANATOMY PRACTICAL-I			
Course Code	BOPT1051			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

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

Course Outcomes:

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

Text Books

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

Reference Books

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

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

List of Experiments:

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

Continuous Assessment Pattern

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

Name of The Course	General Physiology Lab-I			
Course Code	BOPT1052			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective

At the end of the course the student will be able to: • Explain the normal functioning of various organ systems of the body and their interactions. • Elucidate the physiological aspects of normal growth and development. • Describe the physiological response and adaptations to environmental stresses. • Know the physiological principles underlying pathogenesis of disease.

Course Outcome

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

TEXT BOOKS:-

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

REFERENCE BOOKS:-

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

2. A C Guyton: Text book of Medical Physiology, 8th edition, saunders company, Japan, 3. G J Tortora, B Derrickson: Principles of anatomy & physiology,11th edition, Harper & Row Publishers, New York

List of Experiments:

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

Continuous Assessment Pattern

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

Name of The Course	Basic Biochemistry Lab			
Course Code	BOPT1053			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives

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

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

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

REFERENCE BOOKS:

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

Course Outcome

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

LIST OF EXPERIMENTS:

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

Continuous Assessment Pattern

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

Name of The Course	Geometrical Optics Lab-I			
Course Code	BOPT1054			
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. 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

Course Outcome

CO-I	Remember knowledge of mirrors and lenses, Predict and interprest the basic properties of the images formed on the retina by the optics of the eye.

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	Functional English Lab-1			
Course Code	FENG1002			
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

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	BOPT2001			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

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

Course Outcomes

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

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

Text Books

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

Reference Books

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

Course Content

Unit I: Central nervous system	**8 hours**
1.1 Spinal cord and brain stem 1.2 Cerebellum 1.3 Cerebrum.	
Unit II: Orbit	**8 hours**
Orbit 2.1 Eye 2.2 Sclera 2.3 Cornea 2.4 Choroid	

2.5 Ciliary body 2.6 Iris 2.7 Retina	
Unit III: Refractory media- 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	BOPT2002				
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 **8 Hours** 17. Scotopic and Photopic vision 18. Color vision, Color mixing 19. Mechanism of accommodation 20. Retinal sensitivity and Visibility
Unit V: Visual function **8 hours** Receptive stimulation and flicker 22. Ocular, movements and saccades 23. Visual perception and adaptation 24. Introduction to visual psychology (Psychophysics)
Unit VI : Recent Advances **8hours** **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**

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	BOPT2003			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	3	0	0	3

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

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

Text Books

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

Reference Books

1 Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

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

Course Content

Unit I: Nature of Light **8 hours** Nature of light –light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. 2. Sources of light; Electromagnetic Spectrum. 3. Polarized light; linearly polarized light; and circularly polarized light.
Unit II: Polarised light **8 hours** 6 Intensity of polarized light; Malus'Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. 5. Birefringence; ordinary and extraordinary rays. 6. Relationship between amplitude and intensity. 7. Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
Unit III: Interferance **8 hours** 12 Double slits, multiple slits, gratings. 9. Diffraction; diffraction by a circular aperture; Airy's disc 10. Resolution of an instrument (telescope, for example); Raleigh's criterion

Unit IV LASER **8 hours** Scattering; Raleigh's scattering; Tyndall effect. 12. Fluorescence and Phosphorescence 2 13. Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein's theory of lasers.
Unit V Radiometry **8 hours** . Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units 15. Inverse square law of photometry; Lambert's law. 16. Other units of light measurement; retinal illumination;
Unit VI Recent Advancements in Hospital Wate **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	Infection Control Measure			
Course Code	BOPT2004			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:

- Be able to identify sources of infections.
- Understand the various ways that infections may be transmitted.
- Understand the chain of infection and how it helps us identify effective ways to control risks.
- Be fully aware of what preventative measures and remedial actions help prevent infections from transmitting.

Course Outcomes

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

CO1	Background of infection prevention and control
CO2	The prevention and control of infection
CO3	Preventive practices
CO4	Explain and demonstrate the knowledge in correcting the refractive errors
CO5	Management of infectious diseases

Text Books

1. Text Book of Preventive and Social Medicine by Piyush Gupta
2. Community Medicine with Recent Advances: A. H. Suryakantha

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Course Content

Unit I: **8 hours** Background of infection prevention and control
Unit II: **8 hours** : The prevention and control of infection
Unit III: Preventive practices **8 hours** Preventive practices Use of engineering and work practice controls and preventive practices to reduce the opportunity for exposure to potentially contaminated material and infected patients
Unit IV Infection prevention and control **8 hours** Creation and maintenance of a safe environment through application of infection prevention and control principles and practices

Unit V Management of infectious diseases . Prevention and management of infectious diseases in healthcare workers	**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	Operation Theatre Management			
Course Code	BOPT2005			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:
To manage Operation Theatre. Role of each member in team. Infection control. Hospital waste management. Rules and regulations regarding Operation theatre management.
Medical **waste** is any kind of **waste** that contains infectious material (or material that's potentially infectious). This **definition** includes **waste** generated by **healthcare** facilities like physician's offices, **hospitals**, dental practices, laboratories, medical research facilities, and veterinary clinics.

Course Outcomes

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

CO1	Know about Operation Theatre
CO2	Know about Role of Operation theatre staff
CO3	Preventive practices & Infection control methods
CO4	Hospital waste control
CO5	Rules and regulations

Text Books

1 Text Book of Preventive and Social Medicine by Piyush Gupta
2 Community Medicine with Recent Advances: A. H. Suryakantha
.3 Fluke C. Handling hazardous **waste**. J … **hospital**. Pak J Med Res 2001;40:13-17. 3. Ather S

Course Content

Unit I: Operation Theatre introduction **8 hours**

1. Introduction aim and objective of this course
2. Definition of minor OT, Full fledge Operation Theatre, First Aid centre, PHC, and Emergency, OPD, IPD.
3. Operation theatre and its basic standards
4. Role and need of Operation theatre
5. Operation theatre and its types
6. Operation theatre and various treatments of Eye done there
7. Role of Optometrist in Operation theatre

Unit II: Role of Operation theatre staff **8 hours**

1. Infection control Measures
2. Communicable diseases.
3. Decontaminating/Disinfections/ Sterilization
4. Techniques of infection control': autoclaving / shredding /incrimination /bio hazard symbols. Microwave,, plasma torch.
5. Infection control system in hospital Technologies a)Wet thermal technology b) Incineration-different models Alternative Treatment Technologies Microwave Technology Rotaclave system, Hydro clave system Electro Thermal Reactivation(ETP), Treatment Process Electron beam Technology, Plasma Pyrolysis/Gasoficaton systems
6. Hospital acquired Infection Health & safety Practices
7. Usage of protective equipment Occupational health programmers & safety practices Emergency measures.
8. Management of non-clinical support devices pretreatment of linen, laundry, central sterilization unit(CSSD)

Unit III: Hospital waste)
8 hours
Preventive practices Use of engineering and work practice controls and preventive practices to reduce the opportunity for exposure to potentially contaminated material and infected patients

Unit IV Infection prevention and control
8 hours

1. Hospital waste management
2. What is waste,
3. Sources of waste more specifically Hospital waste
4. Specification of waste. Color coding and risk associated with them.
5. Disposal Technologies Collection & Handling of waste Recycle, Reuse and disposal of waste
6. Legislation, policies and law regarding environment on Health care waste management. Biomedical waste management and handling rules, 1998 and its amendment there after.CPCB guidelines. (Central pollution control board)Some idea on safe disposal of Radioactive waste rules,1995 guideline of BARC

Unit V Rules and regulations **8 hours**

1. Rules and regulations regarding Operation theatre management
2. Government policies and practices
3. Medical standards NABH
4. Medical Negligence rules and regulations

Continuous Assessment Pattern

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

Name of The Course	Hospital Waste Management			
Course Code	BOPT2006			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:
To manage medical waste. Medical **waste** is any kind of **waste** that contains infectious material (or material that's potentially infectious). This **definition** includes **waste** generated by **healthcare** facilities like physician's offices, **hospitals**, dental practices, laboratories, medical research facilities, and veterinary clinics..

Course Outcomes

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

CO1	Know about Hospital Waste management
CO2	Know about Role of Legislation, policies and law
CO3	Know about Basic steps in Health Care Waste Management Segregation
CO4	Know about Handling of waste & Infection control
CO5	Know about Disposal Technologies:

Text Books

2 Text Book of Preventive and Social Medicine by Piyush Gupta
2 Community Medicine with Recent Advances: A. H. Suryakantha
.3 Fluke C. Handling hazardous **waste**. J … **hospital**. Pak J Med Res 2001;40:13-17. 3. Ather S

Course Content

Unit I Introduction of Hospital Waste **8 hours**

Introduction, definition of general and hazardous health care waste and diseases.
Infectious waste, genotoxic waste, waste sharps, biomedical waste categories categorization and composition of Biomedical waste.
Specification of materials. Color coding.
Sources of Health care wastes, Hospitals and health care establishments & other sources. Specifically Communicable diseases.

Unit II: Legislation, policies and law **8 hours**

Legislation, policies and law regarding environment on Health care waste management. Biomedical waste management and handling rules, 1998 and its amendment there after.CPCB guidelines. (Central pollution control board)Some idea on safe disposal of Radioactive waste rules,1995 guideline of BARC

Unit III: Basic steps in Health Care Waste Management Segregation **8 hours**

Basic steps in Health Care Waste Management Segregation at the point of generation sharp Decontaminating/Disinfections unit on container for autoclaving Sharp waste containers for storage and

transportation autoclaving/ shredding /incrimination /bio hazard symbols. Microwave, Hydropulbing, plasma torch.
Unit IV Handling of waste & Infection control **8 hours** Collection & Handling of waste. Infection control system in hospital. Needle sticks injury and other sharp injury and hospital policy for protection of health care workers. On site Pre-treatment of waste. Conventional Treatment Technologies a)Wet thermal technology b) Incineration-different models Alternative Treatment Technologies Microwave Technology Rotaclave system, Hydro clave system Electro Thermal Reactivation(ETP), Treatment Process Electron beam Technology, Plasma Pyrolysis/Gasificaton systems.
Unit V Disposal Technologies **8 hours** (a) Sharp disposal pit (b) Deep-burial pit (c) Secured land fill. Waste Minimization Recycling. Re-use. Health & safety Practices. Usage of protective equipment Occupational health programmers & safety practices Emergency measures. Management of non-clinical support devices pretreatment of linen, laundry, cental sterilization unit(CSSD)

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	BOPT2007				
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. 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.

Course Content

Unit I: . Eye & its Functions **8 hours** **1** Vergence and vergence techniques revised. Gullstrand's schematic eyes, visual acuity, Stile Crawford
Unit II: Refractive Errors **8 hours** 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 dioptoric power, angular magnification of spectacles in aphakic.
Unit III: Astigmatism **8 hours** 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

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

Continuous Assessment Pattern

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

Name of The Course	Functional English-II			
Course Code	FENG1003			
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 **8 hours**

- Technical Writing: Meaning, Types, Style, Features
- Report: Types, Format, Structure, Citation, Planning and writing, Project report
-

Unit II: Planning and Writing **8 hours** • Manual and user guide: general layout, planning and writing
Unit III: Proposal **8 hours** • 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** • 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	BOPT2051			
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.

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 Appartus
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	BOPT2052			
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

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	BOPT2053			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objective:

The objective of the course is to:

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

Course Outcomes

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

CO1	A thorough demonstrative knowledge of properties of light

Text Books

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

Reference Books

1 Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts,

List of Experiments

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

Continuous Assessment Pattern

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

Name of The Course	Geometrical Optics Lab-II			
Course Code	BOPT2054			
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

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	**Functional English Lab-II**				
Course Code	**FENG1004**				
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

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	BOPT3001			
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

1. BURTON G.R.W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.

2. M J Pelczar (Jr),ECS Chan, NR Krieg : Microbiology ,fifth edition, TATA McGRAW-HILL Publisher, New Delhi,1993

Reference Book (s)

1 KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth . edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical . Microbiology

2 YDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM) 5) . PREREQUISITES: Higher secondary Biology

Course Content

Unit-1 Introduction 1 ntroduction to microbiology 2. Morphology & classification of microorganisms 3. Sterilisation & Disinfectatnts 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	BOPT3002			
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 Tunnacliffe: 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	BOPT3003			
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.. **8 hour** Tilt induced power in spectacles Aberration in Ophthalmic Lenses
Unit-6 **effect of optical abberation 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	BOPT3004			
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 undestand and generalise the scope and importance of different ophthalmic instruments and appliances
CO2	To explain and demonstate the functioning and applications in different diseases
CO3	To be able to practice with ophthalmic instruments
CO4	To get operationlize 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- 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

Course Content

Unit I: Refractive instruments **8 hours**

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

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	BOPT3005			
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 **8 hours** 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)
Unit III: Lacrimal System & Conjunctiva **8 hours** 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
Unit IV : Cornea **8 hours** 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
Unit V: Uveal Tract and Sclera **8 hours** Anatomy and Physiology of Uvea 6.2 Uveitis 6.3 Etiology 6.4 Pathology 6.5 Anterior Uveitis 6.6 Posterior Uveitis 6.7 Purulent Uveitis 6.8 Endophthalmitis

6.9 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 8 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**

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	BOPT3006			
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	**8 hours**
History taking Visual acuity estimation Extraocular motility, Cover teat, Alternating cover test Hirschberg test, Modified Krimsky Pupils Examination	
Unit II: Various test	**8 hours**
Maddox Rod Van Herrick External examination of the eye, Lid Eversion Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),	
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	BOPT3007			
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 FANDAMENTALS			
Course Code	COMP1111			
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

Unit I Introduction **8 hours** . Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages. 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). 3. Processor and memory: The Central Processing Unit (CPU), main memory.
Unit II: Introduction to Storage Device **8 hours** Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices. 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.).
Unit III: Introduction to MS-Word **8 hours** 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.

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	BOPT3051			
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

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 flourescence 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	BOPT3052			
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

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 perfrom the caliberation of optometric instrument and appliances of lensometer

2 To study and perform the experiment of optometric instrument and alliences of tonometer

3 To study and perform the experiment of optometric instrument and appliances of slitlamp

4 To study and perfrom the experiment of optometric instrument and appliances of colour vision tests

5 To study and perfrom 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 perfrom 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	BOPT3053			
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

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 conjuctival Disease(Bacterial, Fungal, Viral, Protozoa, Helminth)

5 Diagnosis & management of conjuctival 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 FANDAMENTALS LAB			
Course Code	COMP1112			
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.

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	BOPT4001			
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 troble 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, Phisical& Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

Course Content

Unit-1 Spectacle Lenses - II: **8 hours**

Manufacture of glass
- 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:
- 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

Tinted & Protective Lenses
• Characteristics of tinted lenses Absorptive Glasses
• Polarizing Filters, Photochromic & Reflecting filters
• Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses

Unit-2 Multifocal Lenses: **8 hour**
Introduction, history and development, types
• Bifocal lenses, Trifocal & Progressive addition lenses
Reflection from spectacle lens surface & lens coatings:
• Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line
• Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating
Miscellaneous Spectacle:
• Iseikonic lenses
• Spectacle magnifiers
• Recumbent prisms
• Fresnel prism and lenses
• Lenticular &Aspherical lenses
• High Refractive index glasses

Unit-3 Spectacle **8 hour**
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

Unit-4 Optical devices **8 hour**
Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)
6. Neutralization –Hand &lensometer, axis marking, prism marking
7. Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)
8. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit

Unit-5 Spectacle **repair** **8 hour**
Spectacle repairs –tools, methods, soldering, riveting, frame adjustments
10. Special types of spectacle frames
➢ Monocles
➢ Ptosis crutches
➢ Industrial safety glasses
➢ Welding glasses
12. Frame availability in Indian market
13. FAQ's by customers and their ideal answers

Unit-6 Recent Advancement **8 hour**
Dispensing Optician

Raising the standards and profile of the optician profession across the globe

New technologies and diagnostic tools in Optometry

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	BOPT4002			
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 Tunnacliffe: 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 Far and near point of accommodation Range and amplitude of accommodation Mechanism of accommodation Variation of accommodation with age Anomalies of accommodation Presbyopia Hypermetropia and accommodation	**8 hours**
Unit-2 Convergence: Type, Measurement and Anomalies	**8 hour**

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

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	BOPT4003			
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 approch 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 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 Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

Course Content

Unit I: Retina and Vitreous: **8 hours**

- Applied Anatomy
- Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery)
- Inflammatory disorders (Retinitis : Acute purulent , Bacterial, Virus, mycotic)
- Retinal Vasculitis (Eales's)
- Retinal Artery Occlusion (Central retinal Artery occlusion)
- Retinal Vein occlusion (Ischaemic, Non Ischaemic , Branch retinal vein occlusion)
- Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations

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

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	BOPT4004			
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 betweeen 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 Thrombosis Infarction Embolism Clinical pathology Interpretation of urine report Interpretation of blood smears.	**8 hours**
Unit V: Immune system Immune system Shock, Anaphylaxis. Allergy	**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	BASIC AND OCULAR PAHARMOCOLOGY			
Course Code	BOPT4005			
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 aquire knowledege 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 dosate and roots of administration
CO5	students should aquire 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 papillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Antihypertensive sand 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	BOPT4006			
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 prespectivies
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 Quality assurance and management Basics of emergency care and life support skills	**8 hours**
Unit II: Waste Management Biomedical waste management and environment safety Infection and prevention control	**8 hours**
Unit III: Ocular Pharmacology Antibiotic resistance Disaster preparedness and management	**8 hours**
Unit IV : Psychology Intelligence Learning, Memory, Personality, Motiviation Body Integrity – one's body image The patient in his Milen	**8 hours**

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**

Name of The Course	BIOSTATISTICS			
Course Code	BOPT4007			
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. Biostatistics provides a framework for addressing management problems in research. By the end of the course you will have been exposed to many research ideas, theories and applications.

Course Outcomes:

CO1	To understand the structure and functions of different research
CO2	To develop skills in planning, building and managing data of research
CO3	To make familiarize students with concepts and techniques of Biostatistics
CO4	To understand the biostatistics and is out come to be achieved
CO5	To understand biostatistics of medical records

Text Book (s):

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

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

Reference Book (s)

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

Course Content:

Unit-1 Introduction **8 hours**

Introduction to research methods

Identifying research problem

Ethical issues in research

Research design

Unit-2 Biostatistics **8 hours**

Basics of Biostatistics

Introduction of Biostatistics

Measures of Morality

Types of Data

Research tools and Data collection methods

Sampling methods

	Developing a research proposal
Unit-3	**BIOSTATISTICS ADVANCEMENTS** **8 hours** Sampling Statistical significance Correlation Binding & Randomisation Pi charts
Unit-4	Sampling 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	Hospital Statistics and use of Biostatistics in Medical research 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	HEALTH CARE ORGANISATION			
Course Code	BOPT4008			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objective:

The objective of the course is to:
Health Care Management provides a framework for addressing management problems in health care organizations. By the end of the course you will have been exposed to many management ideas, theories and applications

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

CO1	To understand the structure and functions of different departments of a hospital and health care organization
CO2	To develop skills in planning, building and managing hospitals and health care.
CO3	To make familiarize students with concepts and techniques of Modern Management in different health care units.
CO4	To understand the organizational vision and missions to be followed to achieve it
CO5	To understand management of medical records

Text Book

1. Health Sector Reform in Developing Countries - Peter Berman, Harvard University Press, 1995.

2. Health Policy and Management - The health care Agenda in a British political contact - column Paton, 1996, Chapman & Hall Publication (Madras).

Reference Books

1. Health Planning For Effective Management - William A. Reinke, 1988, Oxford University Press.

Course Content

Unit I: Introduction **8 hours** Concept of Hospitals - Planning and Design of a Hospital (Building & Physical Layout) - space Required for Separate Functions - Different types of Hospitals - Problems and constrains in different type of Hospitals - History of Hospital Development - Departmental and organization structure of different types of hospitals.
Unit II: Departments in a Hospital **8 hours** Organization - Structure - Vertical & Horizontal - Clinical & Non - clinical - supportive & Ancillary Service Departments –optical clinic-multinational-eye camp(PHC-secondary-Tertiary).
Unit III: Management & Organisation of Clinical services **8 hours**

Organization and Administration of various clinical services – Outpatient service - Inpatient Services - Emergency Services - Operation Theater - ICUs - super Specialty Service including their utilization study - Nursing Care and Ward Management.
Unit IV Organisation & management of Utilities services **8 hours** Organizing and Managing Facility Support Services - Laundry - Housekeeping - Pest control managing the Estate (Hospital Security) - Recent trends in disaster Management - Hospital Engineering Services (Plumbing, electricity, Civil, A/c, LiŌs)- Ambulance Service.
Unit V: Evaluation of Hospital & Health services **8 hours** Accreditation - Setting of objective - Health indicators - applying Economic concepts to Service Evaluation - Assessing Patient Satisfaction - Techniques of Hospital Service Evaluation - Indicators of Hospital Efficiency and Effectiveness - Evaluation of Quality of Hospital Services - Management of Hazard and Safety in a Hospital Setup - Nursing Services in a Hospital - current - Issues in Hospital Management

Continuous Assessment Pattern

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

Name of The Course	APPLIED PSYCHOLOGY			
Course Code	BOPT4009			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives: This course deals with the basic s of Applied Psychology. It also introduces the students to the concepts ofApplied Psychology measures and to inculcate the theoretical knowledge and clinical exposure of Applied Psychology.

Course Outcomes

CO1	To understand about Applied Psychology
CO2	To develop skills in planning, building and managing data of Applied Psychology
CO3	To make familiarize students with concepts and techniques of Applied Psychology
CO4	To understand about Applied Psychology and is out come to be achieved
CO5	To understand Applied Psychologyof a Patient and their relatives.

Text Book (s):

Mausner: Applied Psychology-An Introductory text, 2nd Ed., W. B. Saunders Co.

Morton & J. Richard Hebd: A study guide to Applied Psychology, 2nd Ed., University Park Press,

J Smoller, Applied PsychologyA Primer for health and Biomedical professionals, 4th edition, Springs, 2015

Reference Book (s)

Unit-1 **Introductio** **8 hours**

Basics of Psychologystudy methods

Types of study designs

- Introduction to Applied Psychology
- Identifying Applied Psychology problem
- Ethical issues in Applied Psychology
- Applied Psychology design

Unit-2 **Tools of** Applied Psychology 8 hours

- Measurements and assessments
- Age related cataract
- Low Vision
- Diabetic retinopathy
- Glaucoma
- Research tools and Data collection methods

	▪ Sampling methods
Unit-3	Clinical Applied Psychology 8 hours • Age related Macular Degeneration • Vitamin A deficiency • Corneal and external diseases • Prevention strategies .1 Sampling .2 Statistical significance .3 Correlation .4 Binding &Randomisation
Unit-4	Role of team work in Applied Psychology 8 hours • Concept of Health and Disease • Principles of Epidemiology and Epidemiological Methods • Screening for Eye Disease – Refractive errors, Low Vision, Cataract, Diabetic retinopathy,Glaucoma, Amblyopia,Squint. • Blindness
Unit-5 ***Scope in Applied Psychology*** ***Latest Advances***	• Health Information and Basic MedicalStatistics • Communication for HealthEducation • Health Planning and Management • Health care of community • How to plan and implementVision2020 • Hospital Statistics and use of Applied Psychology in Medical research • Use of computerized software for Applied Psychology

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 II &DISPENSING OPTICS - PRACTICAL			
Course Code	BOPT4051			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	0	0	2	1

Course Objectives:
Skills and knowledge to be aquired on right selection of frame and right selection of ophthalmic lens and delivery management

Course Outcomes

CO1	Skills and knowledge to be aquired on right selection of frame and right selection of ophthalmic lens and delivery management

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, 3rdedition, Butterworth - Heinemann, 2007

Reference Book (s)

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

List of Experiments

1) Experiment to understand the functions of various optometric instruments available in trail set

2) Experiment to analyse and evaluate the dioptric power of the spherocylinderical 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	BOPT4052			
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

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, 3rdedition, Butterworth - Heinemann, 2007

Reference Book (s)

1. Michael P Keating: Geometric, Phisical& 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 priniciple,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	BOPT4053			
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,epidemology,symptoms,signs and diagnosis of various ocular diseases

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 prcedure and investigation of retinal diseases
2	Experiment to understand the procedure and management of mechanical injuries
3	Experiment to understand the procedure and managemenr of non mechanical injuries
4	Experiment to understand the procedure and clinical examination of cataract
5	Experiment to understand the procedure and clinical exmination 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	BOPT4054			
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

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	BOPT5001			
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 summerise 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, 5thedition, 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 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	**6 hours**
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
• Rose K lenses • Ortho K lenses • Theraputic 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 AIDS & VISUAL REHABILITATION			
Course Code	BOPT5002			
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	BOPT5003			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

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
Unit-3 **8 hours**
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
Unit-4 **9 hours**
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
Unit-5 **8 hours**
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	BOPT5004			
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 VisionHeterophoric, 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 Classsification 12.2 Aeitiology 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	BOPT5005			
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 knowledgable about the definitions of systemic diseases
CO3	students should be knowledgable 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	BOPT5006			
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	LLLL1001				
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 lattest 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.

Unit-1 Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 8 hours

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

Unit-2 Understanding Harmony in the Human Being - Harmony in Myself 8 hours

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

Unit-3 Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship 10 hours

1. Understanding harmony in the Family- the basic unit of human interaction
2. Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfilment to ensure *Ubhay-tripti*;

   Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
3. Understanding the meaning of *Vishwas*; 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 syste

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	BOPT5051				
Prerequisite					
Corequisite					
Antirequisite					
		L	T	P	C
		0	0	2	1

Course Outcomes

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

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	BOPT5052			
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

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	BOPT5053			
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

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 VisionHeterophoric, 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	Experimemt 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	BOVT5054			
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.

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 caliberate 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	BOPT6001			
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 summerise 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, 5thedition, 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 **6 Hours** **Recent Advancements in Contact lens** **Cosmetic contact lenses** **Prosthetic contact lenses** **Scleral and semi sclera lenses** **Market availability of 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	Binocular vision – II			
Course Code	BOPT6002			
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 anamy 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 VisionHeterophoric, 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 theraphies 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	BOPT6003			
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 aquire knowledge on prevelence of various eye diseasesd
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) :

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

Reference Book (s) :

1. 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	BOPT6004				
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	BOPT6005			
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	BOVT6006			
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 –heinneman,USA,2002
3. David Henson: Optometric Instrumentations, Butterworth- Heinnemann, 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 occulder 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:

• 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**
Observing And Reporting: Understand the importance of observing and reporting before, during & after procedure • Understanding the importance of timely information to the appropriate authority in case of routine and emergency situations. Infection Control Measures - Policies and Procedures: • To understand the importance of hand washing and its steps • To understand ; Needle Stick Injuries (NSI) • To gain understanding regarding transmission based precautions and & its types • To understand the meaning of ventilation and state it's clinical significance • To understand the principles of linen management • To understand the process of cleaning, sterilization and disinfection of equipment and work area along with it's significance • To understand various occupational hazards for a health worker Confidentiality, Documentation & Records: • Understand guidelines for documentation • Learn various types of records of importance for vision technician • Understand use and importance of records. • To be able to maintain the confidentiality of the medical records • Understand abbreviations and symbols • Enter, transcribe, record, store, or maintain information in written or electronic/magnetic form
Unit-5 **8 hours**
Professional Behaviour In Healthcare Setting: • How to maintain restful environment • Learn general and specific etiquettes to be observed on duty • Understand need for compliance of organizational hierarchy and reporting • Understand the legal and ethical issues • Understand importance of conservation of resources Basic Computer Knowledge: • To gain broad understanding about Application of computers in • Practice • Give Introduction to Computers: • Block diagram • Input and Output devices • Storage devices • Give Introduction to operating systems • Need of Operating systems (OS) • Function of OS • Windows 2000 – Utilities and basic operations
Unit-6 **8 hours**
Recent Advancements in field of Vision Technician: **• 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	Hospital Management			
Course Code	BOPT6007			
Prerequisite				
Corequisite				
Antirequisite				
	L	**T**	**P**	**C**
	2	0	0	2

Course Outcomes

CO1	To understand the structure and functions of different departments of a hospital and health care Management.
CO2	To develop skills in patients satisfaction and managing hospitals and health care.
CO3	To understand management of medical records and HRM management.
CO4	Students will be able to understand hospital management and safety of medical records
CO5	To understand the organizational vision and missions to be followed to achieve it

Reference Book (s)

3. Health Sector Reform in Developing Countries - Peter Berman, Harvard University Press, 1995.

4. Health Policy and Management - The health care Agenda in a British political contact - column Paton, 1996, Chapman & Hall Publication (Madras).

5. Health Planning For Effective Management - William A. Reinke, 1988, Oxford University Press.

Course Content:

Unit-1 Introduction **8 hours**

1. Concept of Hospitals
2. Planning and Design of a Hospital (Building & Physical Layout).
3. Space required for Separate Functions.
4.Different types of Hospitals - Problems and constrains in different type of Hospitals - History of Hospital Development - Departmental and organization structure of different types of hospitals.

Unit-2 HOSPITAL SERVICES AND ADVERTISING **8 hours**

1. Blindness and its causes
2. Prevention of blindness
   a) At Global level
   b) NPCB
   c) Vision 2020
3. Blindness and Rehabilitation of blind
4. Eye camps
5. School Eye Screening Programmes
6. Industrial hazards and protection from industrial hazards
7. Statistical evaluation of surveys

Unit-3 Human Resources Management **8 hours**

1.objectives of HRD
2.HRD system
3.HR planning
4.Prerequiestes of Manpower planning
5.obstacle of HR planning

Unit-4 Critical Units and Time management	**8 hours**
.Sterilization of operation theatres 2. Asepesis : how to achieve 3. Anaesthetic agents 4. Local ocular anaesthesia 5. Maintenance and working of Phacomachines, vitrectomy, operating microscopes 6. Preoperative and postoperative instructions 7. Assistance in ocular surgeries and trolley preparation 8. Maintenance of ophthalmic instruments	
Unit-5 Rules and Regulation for Hospital	**8 hours**
1.Professionalism and Values 2.Stock control and costing 3.Staffing and staff relations 4.NABH following for pay role 5.Hospital WasteMangement(HWM)	

Continuous Assessment Pattern

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

Name of The Course	Optometry clinic and retail management				
Course Code	BOPT6008				
Prerequisite	Dispensing optometry, Optics, ocular diseases etc				
Corequisite					
Antirequisite					
	L	**T**	**P**	**C**	
	2	0	0	2	

Course Objectives: This is a hands-on course to learn the basics of optical clinical management. Students will perform the refraction, generate prescription and finalise the management. Curve generation, fine grinding, polishing, figuring, and testing are some of the tasks to be done. Some theoretical aspects are discussed, such as theories of grinding and polishing, subsurface damage, surface roughness, and testing. The emphasis of the course is to produce optical elements by applying abstract optical concepts. Occasionally students get involved in aluminizing their mirrors.

Course Outcomes

CO1	**Students will gain knowledge on stock maintenance and taxation**
CO2	**Students will understand the importance of registration and professional body relationship**
CO3	**Student will understand the importance of customer relationship and ways for improve customer satisfaction**
CO4	**Students will gain knowledge on sale management and background processing**
CO5	**Students will understand the importance of referral system**

Text Book (s) :

1) **System of ophthalmic dispensing – Clifford W. Brooks**
2) **Clinical Refraction - Borish**

Reference Book (s)

1. **Comprehensive Ophthalmology – Jack J Kanski**

Unit-1 Introduction	**8 hours**
Data management and stock ledger **Different formats and management** **Stock count and maintenance**	
Unit-2	**8 hours**
Referral management and promotional plans **Corporate tie ups** **Residential eye screening programmes** **Management of customer walk-ins through referral and screening programmes**	
Unit-3	**8 hours**
Importance of advertising **Medias of advertising** **Role of seasonal promotions** **Importance of performance targets and growth matrix in maintenance of structural business**	
Unit-4	**8 hours**
Importance of referral **Feedback system** **Incorporation of current optometry advancements and maintance of structural balance of clinic**	
Unit-5	**8 hours**
Franchise mantainace and access of data **Role of communication among the clinician and lab**	

Fitting standards **Ethical maintenance of patient data safety and preservation**

Continuous Assessment Pattern

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

Name of The Course	PHC & Eye Camp management			
Course Code	BOPT6009			
Prerequisite				
Corequisite				
Antirequisite				
	L	T	P	C
	2	0	0	2

Course Objectives: At the end of the course students will be be knowledgeable in the following areas: Community based eye care in India.

Prevalence of various eye diseases

Developing Information Education Communication materials on eye and vision care for

the benefit of the public

Organize health education programmes in the community

Vision screening for various eye diseases in the community and for different age groups.

Course Outcomes

CO1	Students should understand about public health care.
CO2	Student should acquire knowledge on prevalence of various eye diseases.
CO3	Students should be aware about importance of community health care.
CO4	Students should able to organize health education programmes in community.
CO5	Students should be aware about the roles of optometrist in PHC & eye camps.

Text Book (s)

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

Reference Book (s)

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

Unit-1 Introduction & Requirement	**8 hours**
History of public health History of public optometry Organization of health services(primary, secondary, tertiary care) Public health in India Concept of preventive and curative health care	
Unit-2 Epidemiology of blindness	**8 hours**
Prevalence, incidence and distribution of visual impairment Causes of blindness in India	
Unit-3 PHC management	**8 hours**

Concept of public health. Principles of primary, secondary and tertiary care. Planning of health services
Unit-4 Eye Camp Management 8 hours
School Health Programs–screening. Organization of eye camps. Rehabilitation of the blind.
Unit-5 Role of Optometrist 8 hours
Role of Optometrist in managing eye camps. NPCB and refractive blindness – optometrist's role as primary health care provides. Role of International organization and NGOs in eye care.

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	BOPT6051				
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 maintanance of contact lens

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	Experiement 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	BOPT6052			
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

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 VisionHeterophoric, 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	Experimemt 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	BOVT6053				
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.

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	BOPT6053				
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**

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	BOPT6054				
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**

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 theinstruments 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 litreature 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	BOPT6055			
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**

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 theinstruments 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 litreature 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	BOPT7001				
Prerequisite					
Corequisite					
Antirequisite					
	L	T	P	J	C
	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**
-	
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

Name of The Course	CLINICAL INTERNSHIP INCLUDING RESEARCH PROJECT WORK			
Course Code	BOPT8001			
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