

**STUDY & EVALUATION SCHEME**

**OF**

**BACHELOR OF OPTOMETRY (B.OPTOM)**

[APPLICABLE W.E.F. ACADEMIC SESSION 2017-18 TILL REVISED]



**TEERTHANKER MAHAVEER UNIVERSITY**

**Delhi Road, Moradabad, Uttar Pradesh**

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**Study & Evaluation Scheme  
Of  
Bachelor of Optometry**

**About Optometry:**

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

‘Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person(‘s) physical, mental, social, emotional, environmental health and holistic well-being.’

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of “allied and healthcare professionals”. In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

**Scope and Need for Allied and Healthcare Professionals in the Indian Healthcare System**

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia’s health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being. Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- ❖ Across the age span of human development from neonate to old age;
- ❖ With patients having complex and challenging problems resulting from systemic illnesses such as, in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- ❖ Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- ❖ In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- ❖ With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

## **Learning Goals And Objectives For Allied And Healthcare Professionals**

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

# TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)



## Study & Evaluation Scheme Of

## Bachelor of Optometry [B.Optom]

### SUMMARY

<b>Programme</b>	: Bachelor of Optometry(B.optom)
<b>Duration</b>	: Four years Full time(Eight semesters) Including one year compulsory Internship
<b>Medium</b>	: English
<b>Minimum Required Attendance</b>	: 75%
<b>Maximum Credits</b>	: 194
<b>Minimum Credits required for the degree:</b>	<b>186</b>

<b>Assessment</b>	:	<b>Internal</b>	<b>External</b>	<b>Total</b>
		40	60	100

#### Internal Evaluation (Theory Papers):

Class Test I	Class Test II	Class Test III	Attendance	Assignment	Total
Best two out of the three					
10	10	10	10	10	40

#### Evaluation of Practical/Dissertations & Project Reports:

Internal	External	Total
50	50	100

#### Duration of Examination:

Internal	External
1.5 Hrs	03 hrs

To qualify a course/subject the student is required to secure a minimum of 45% marks in aggregate including the semester examination and teachers continuous evaluation. (i.e. both internal and external). A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 50% marks in aggregate to clear the semester. The subject marked with asterisk (\*) in Semester-I &II are noncore papers.

**Assessment:**

	<b>Internal</b>	<b>External</b>	<b>Total</b>
<b>Theory</b>	40	60	100
<b>Practical</b>	50	50	100

**English External Evaluation & Assessment:**

The students will be evaluated on all four parameters of LSRW

<b>External Exam</b>	<b>Internal Assessment</b>	<b>Total</b>
50	50	100

**Internal Practical Evaluation (50 marks):**

The Internal evaluation would also be done by the Internal Examiner based on the experiment performed during the internal examination

<b>Experiment</b>	<b>Attendance</b>	<b>Viva+Record</b>	<b>Total Internal</b>
(30 MARKS)	(10 MARKS)	(10 MARKS)	(50 MARKS)

**External Practical Evaluation (50 marks):**

The external evaluation would also be done by the External Examiner based on the experiment performed during the external examination.

<b>Experiment</b>	<b>File work</b>	<b>Viva</b>	<b>Total External</b>
(30 MARKS)	(10 MARKS)	(10 MARKS)	(50 MARKS)

### **Internal Theory Assessment: 40**

<b>Best 2 out of Three CTs</b>	<b>Attendance</b>	<b>Assignments</b>	<b>Total</b>
20	10	10	40

### **English Internal Theory Assessment: 50**

<b>Best 2 out of Three CTs</b>	<b>Attendance</b>	<b>Workbook Assignments &amp; Viva</b>	<b>Total</b>
20	10	10+10	50

Viva to be carried out by external English faculty from within the university

### **Question paper structure (theory external examination):**

Max. Marks in each theory paper will be 60. The question paper shall consist of 6 questions, Out of which first question shall be of short answer type (not exceeding 50 words) and will be Compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 2 marks each). Out of the remaining five questions, the long answer pattern will have internal choice with unit wise questions. In units having numerical, weightage and information should be available both in the syllabus and the paper pattern. The weightage of Question No. 2 to 6 shall be 10 marks each.

**Admission to the Next Semester:** As per the university norms.

## **INTERNSHIP**

Internship is a phase of training where a student is expected to conduct actual practice of clinical optometry and acquire skills under supervision so that he/she may become capable of functioning independently.

### **INTERNSHIP DURATION: ONE YEAR**

#### **OTHER DETAILS**

- ❖ The students are required to do internship for first six months at parent institute and last six months at any recognized eye institute/Hospital
  
- ❖ Every candidate will be required after successfully completing the final Bachelor in Optometry Examination, to undergo compulsory rotator internship to satisfaction of the University for a period of 6 months so as to be eligible for the award of the degree.
  
- ❖ The University shall issue a provisional degree of Bachelor in Optometry on passing the final examination after the completion of internship on demand by the candidate.
  
- ❖ The internee shall be entrusted with optometry responsibilities under direct supervision of Senior Optometrist. They shall not be working independently.
  
- ❖ Internee will not issue certified copy of investigation reports or other related documents under their signature.

#### **ASSESSMENT OF INTERNSHIP**

- ❖ The Internee shall maintain the record of work, which is to be verified and certified by the senior Optometrist under whom he/she works. Apart from scrutiny of record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during at the end of training. Based on the record of work and date of evaluation The Director/Principal shall issue certificate for satisfactory completion of training following which the university shall award the degree of Bachelor in Optometry to the candidate.
- Satisfactory completion shall be determined on the basis of the following.
- Proficiency of knowledge required for each Optometry techniques.
- The competency and skills expected to manage each optometry technique.
- Responsibility, punctuality works up of optometry techniques, involvement in special procedures and preparation of reports.
- Capacity to work in a team (behavior with colleagues, nursing staff and relationship with medical and paramedical).
- Initiating, participating in discussions and developing research aptitude.

- ❖ Only 12 leaves are allowed to an internee during the period of his/her internship. If he/she extend his/her leave in the duration of internship, the period the internship shall be extended by double the days for which the student was absent.

### **Internship Log Book**

The Log Book Submitted by the candidate will be duly verified & a viva voce shall be conducted on the same at the time of Practical Examination of final year.

<b>S.N.</b>	<b>TOPIC</b>	<b>NO. OF CASES</b>
1	Clinical Observation and Report writing	5
2	Visual Acuity – Distance + Near	5
3	History taking General Specific Conditions	5
4	Visual Acuity – Distance + Near ( log MAR) Pinhole acuity	5
5	Extra ocular Motility	5
6	Cover test	5
7	Push up test (Amplitude of Accommodation)	5
8	Push up test ( Near point of Convergence)	5
9	Stereopsis test	5
10	Tear Break up time	5
11	Amsler's Grid test	5
12	Color vision test	5
13	Schirmer's test	5
14	Confrontation visual field test	5
15	Slit lamp examination	5
16	Digital tonometry	5
17	Schiotz Tonometry	5
18	Von Herick Grading of Anterior chamber depth	5
19	Accommodative facility(+ 2.00 D)	5
20	Corneal Sensitivity test	5
21	IPD measurement	5
22	Proptosis evaluation	5
23	Ptosis evaluation	5
24	Pupillary evaluation Direct Consensual RAPD	5
25	Maddox rod (Phoria)	5

26	Retinoscopy- Static, Dynamic and Cycloplegic Retinoscopy	5
27	Keratometry	5
28	Subjective Refraction JCC Duo chrome	5
29	Visual Field chart interpretation	5
30	B scan observation	5
31	A scan chart Interpretation	5
32	Case Analysis	5
33	Contact Lens	5
34	Low Vision care Clinic	5
35	Binocular Vision clinic	5
36	Ophthalmology clinic (Common eye conditions)	10

## Study and Evaluation Scheme

### B.Optom Semester- I (First Year)

	S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
<b>Semester I</b>	1	BCO-S- 101	General Anatomy	4	-	-	4	40	60	100
	2	BCO-S-102	General Physiology	4	-	-	4	40	60	100
	3	BCO--S-103	General Bio Chemistry	2	-	-	2	40	60	100
	4	BCO-S-104	Geometrical Optics I	4	-	-	4	40	60	100
	5	BCO-S-105	Nutrition	2	-	-	2	40	60	100
	6	*BCO-S-199	* English Communication & Soft Skills – I	3	-	2	4	50	50	100
	7	BCO-S-151	General Anatomy Practical	-	-	2	1	50	50	100
	8	BCO-S-152	General Physiology Practical	-	-	2	1	50	50	100
	9	BCO-S-153	General Bio Chemistry Practical	-	-	2	1	50	50	100
	10	BCO-S-154	Geometrical Optics-I Practical	-	-	2	1	50	50	100
<b>Total</b>				<b>19</b>		<b>10</b>	<b>24</b>	<b>450</b>	<b>550</b>	<b>1000</b>

- ❖ Seven Lectures to be assigned for Group discussion/Seminar /library
- ❖ Subject marked with asterisk (\*) is non-core paper.

## Study and Evaluation Scheme

### B.Optom Semester- II (First Year)

Semester II	S.NO	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
	1	BCO-S-201	Ocular Anatomy	3	-	-	3	40	60	100
	2	BCO-S-202	Ocular Physiology	3	-	-	3	40	60	100
	3	BCO-S-203	Ocular biochemistry	2	-	-	2	40	60	100
	4	BCO-S-204	Physical Optics	2	-	-	2	40	60	100
	5	BCO-S-205	Geometrical Optics II	2	-	-	2	40	60	100
	6	BCO-S-206	Computer Fundamentals, Internet, & Ms-Office	3	-	-	3	40	60	100
	7	*BCO-S-299	*English Communication & Soft Skills – II	3	-	2	4	50	50	100
	8	BCO-S- 251	Ocular Anatomy Practical	-	-	2	1	50	50	100
	9	BCO-S- 252	Ocular Physiology Practical	-	-	2	1	50	50	100
	10	BCO-S- 253	Ocular Biochemistry Practical	-	-	2	1	50	50	100
	11	BCO-S- 254	Geometrical Optics II Practical	-	-	2	1	50	50	100
	12	BCO-S- 255	Computer Fundamentals, Internet, & Ms-Office Practical	-	-	2	1	50	50	100
	13	BCO-S-256	Hospital Posting	-	-	6	3	50	50	100
	<b>Total</b>			<b>18</b>		<b>18</b>	<b>27</b>	<b>590</b>	<b>710</b>	<b>1300</b>

❖ Subject marked with asterisk (\*) is non-core paper.

**Study and Evaluation Scheme**  
**B.Optom Semester- III (Second Year)**

S.N O	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BCO-S- 301	Ocular Microbiology	2	-	-	2	40	60	100
2	BSC-S-302	Visual Optics- I	2	-	-	2	40	60	100
3	BCO-S-303	Optometric Optics – I	2	-	-	2	40	60	100
4	BCO-S-304	Optometric Instruments	2	-	-	2	40	60	100
5	BCO-S- 305	Ocular Diseases – I	3	-	-	3	40	60	100
6	BCO-S- 306	Clinical Examination Of Visual System	2	-	-	2	40	60	100
7	BCO-S- 307	Indian Medicine and Telemedicine	2	-	-	2	40	60	100
8	BCO-S-308	Environmental Sciences	4	-	-	4	40	60	100
9	BCO-S-399	English Communication & Soft Skills-III	3	-	2	4	50	50	100
10	BCO-S-351	Optometric Optics –I Practical	-	-	2	1	50	50	100
11	BCO-S-352	Optometric Instruments Practical	-	-	2	1	50	50	100
12	BCO-S-353	Ocular Disease-I Practical	-	-	2	1	50	50	100
13	BCO-S-354	Hospital Posting	-	-	6	3	50	50	100
<b>TOTAL</b>			<b>22</b>	<b>-</b>	<b>14</b>	<b>29</b>	<b>570</b>	<b>730</b>	<b>1300</b>

**Semester III**

**Study and Evaluation Scheme**  
**B.Optom Semester- IV (Second Year)**

S.N O	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BCO-S-401	Optometric Optics –II & Dispensing Optics	4	-	-	4	40	60	100
2	BCO-S-402	Visual Optics II	3	-	-	3	40	60	100
3	BCO-S-403	Ocular Disease – II	5	-	-	5	40	60	100
4	BCO-S-404	Pathology	2	-	-	2	40	60	100
5	BCO-S- 405	Basic And Ocular Pharmacology	3	-	-	3	40	60	100
6	BCO-S-406	Introduction To Quality And Patient Safety	2	-	-	2	40	60	100
7	BCO-S-407	Medical Psychology	2	-	-	2	40	60	100
8	BCO-S-499	English Communication & Soft Skills-IV	3	-	2	4	50	50	100
9	BCO-S-451	Optometric Optics –II & Dispensing Practical	-	-	2	1	50	50	100
10	BCO-S-452	Hospital Posting	-	-	6	3	50	50	100
<b>TOTAL</b>			<b>24</b>		<b>10</b>	<b>29</b>	<b>430</b>	<b>570</b>	<b>1000</b>

❖ Two Lectures to be assigned for Seminar / library

**Study and Evaluation Scheme**  
**B.Optom Semester- V (Third Year)**

S.N O.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BCO-S-501	Contact Lens – I	4	-	-	4	40	60	100
2	BCO-S-502	Low Vision Care	3	-	-	3	40	60	100
3	BCO-S- 503	Geriatric Optometry & Pediatric Optometry	3	-	-	3	40	60	100
4	BCO-S- 504	Binocular Vision – I	3	-	-	3	40	60	100
5	BCO-S- 505	Systemic Disease	3	-	-	3	40	60	100
6	BCO-S-506	Research Methodology & Biostatistics	2	-	-	2	40	60	100
7	BCO-S- 551	Contact Lens – I Practical	-	-	2	1	50	50	100
8	BCO-S- 552	Low Vision Care Practical	-	-	2	1	50	50	100
9	BCO-S-553	Geriatric Optometry & Pediatric Optometry Practical	-	-	2	1	50	50	100
10	BCO-S-554	Hospital Posting	-	-	6	3	50	50	100
<b>TOTAL</b>			<b>18</b>		<b>12</b>	<b>24</b>	<b>440</b>	<b>560</b>	<b>1000</b>

❖ Six Lectures to be assigned for Group Discussion/Seminar /library

**Study and Evaluation Scheme**  
**B.Optom Semester- VI (Third Year)**

Semester VI	S.No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
	1	BCO-S- 601	Contact Lens – II	3	-	-	3	40	60	100
	2	BCO-S- 602	Binocular Vision – II	3	-	-	3	40	60	100
	3	BCO-S- 603	Public Health And Community Optometry	2	-	-	2	40	60	100
	4	BCO-S- 604	Practice Management	2	-	-	2	40	60	100
	5	BCO-S- 605	Occupational Optometry	2	-	-	2	40	60	100
	6	BCO-S- 606	Medical Law And Ethics	2	-	-	2	40	60	100
	7	BCO-S- 607	Research Project 1	-	-	4	2	50	50	100
	8	BCO-S- 651	Contact Lens – II Practical	-	-	2	1	50	50	100
9	BCO-S- 652	Binocular Vision – II Practical	-	-	2	1	50	50	100	
10	BCO-S- 653	Hospital Posting	-	-	6	3	50	50	100	
	<b>TOTAL</b>			14		14	21	440	560	1000

❖ Eight Lectures to be assigned for Group Discussion/Seminar / library

**Study and Evaluation Scheme**  
**B.Optom Semester- VII (Fourth Year)**

<b>S.NO</b>	<b>CODE</b>	<b>COURSE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>BCO-S-701</b>	<b>INTERNSHIP-1</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>20</b>
		<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>20</b>

**Study and Evaluation Scheme**  
**B.Optom Semester- VIII (Fourth Year)**

<b>S.NO</b>	<b>CODE</b>	<b>COURSE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	BCO-S-801	INTERNSHIP-2	0	0	38	19
2	BCO-S-802	RESEARCH PROJECT VIVA	0	0	2	1
		TOTAL	0	0	40	20

# FIRST SEMESTER

## COURSE/PAPER -GENERAL ANATOMY

**PAPER CODE: BCO-S-101**

L	T	P	C
4	-	2	5

**Learning Objective-** To enable the students to develop the basic concept of gross, functional and applied anatomy of various structures as well as identification of microscopic structures of various tissues and organs of the human body.

### UNIT -1

Organization and general plan of the body: Levels of Organization, Metabolism and Homeostasis, Terminology and General Plan of the Body, Body Parts and Areas, Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections

### UNIT -2

**Cells:** Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell division, Tissue, Types, Structure, Location and Function of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue, The Integumentary System: structure and function of The Skin, Subcutaneous Tissue

### UNIT -3

**The Skeletal System:** Functions of the Skeleton, Types of Bone Tissue, Classification of Bones, Embryonic Growth of Bone, Factors That Affect Bone Growth and Maintenance, The Skeleton, types of joints and movement

**The Muscular System:** Muscle Structure, Energy Sources for Muscle Contraction, Muscle Fiber  
**Muscle Contraction**—the Sliding Filament Mechanism, Major Muscles of the Body.

### UNIT -4

**The Nervous System** -Nervous System Divisions, Nerve Tissue, Types of Neurons, Nerves and Nerve Tracts, The Nerve Impulse, The Spinal Cord, The Brain, Meninges and Cerebrospinal Fluid, Cranial Nerves, The Autonomic Nervous System and its function

The Senses Sensory Pathway, Characteristics of Sensations, Cutaneous Senses, Muscle Sense, Sense of Taste, Sense of Smell, Hunger and Thirst, the Eye, the Ear

### UNIT-5

**The Endocrine System** -Chemistry of Hormones, Regulation of Hormone Secretion, The Pituitary Gland, Thyroid Gland, Parathyroid Glands, Pancreas, Adrenal Glands, Ovaries, Testes, Other endocrine glands

Embryology: Spermatogenesis, Oogenesis, Gametogenesis, Ovulation and fertilization.

**Learning Outcome-** At the end of the course the student will develop the sense of co-relation between different anatomical structures on the basis of its location and functional aspects.

**TEXT BOOKS:-**

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

**REFERENCE BOOKS:-**

1. Peter L. Williams And Roger Warwick: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.
2. T.S. Ranganathan: Text book of Human Anatomy, 1982, S. Chand & Co., New Delhi 110 055.
3. Inderbir Singh: Human Embryology, 3rd Ed., Macmillan India, 1981.
4. R. Kanagasuntharam, P. Sivananda-Singham & A. Krishnamurti:
5. Anatomy- Regional, Functional, & Clinical, P.G. Publisher, Singapore 1987.

# FIRST SEMESTER

## COURSE/PAPER- GENERAL PHYSIOLOGY-I

COURSE CODE: BCO-S-102

L	T	P	C
4	-	2	5

**Learning Objective-** To enable the students to understand the normal functioning of various organ systems of the body and their interactions.

### UNIT-1

**Cell physiology:** Organization of the Body, Body Composition, Measurement of Body Fluid Volumes, Plasma Volume, Total Blood Volume, & Red Cell Volume, Diffusion, Osmosis, Tonicity

### UNIT-2

**Gastrointestinal physiology:** Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestion of carbohydrates, proteins & lipids, Structure & function of liver, spleen, gall bladder & pancreas, Jaundice, Cirrhosis & Pancreatitis

**Respiratory system:** parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume, and gas transport between lungs and tissues, respiratory adjustments in health and diseases.

### UNIT-3

**Cardiovascular and lymphatic system:** heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure.

Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatic tissue

**Organs of Excretory System:** kidneys, nephron, Mechanism of Excretion Urine formation (glomerular filtration and tubular reabsorption) Electrolytes: their balances and imbalances. Acid-base balance. Acidosis and Alkalosis

### UNIT- 4

**Musculo-skeletal system:** Muscles structure, types of muscles, mechanism of contraction, major muscles of the body,, classification of bones , structure of bones, hormones involved in bone growth, types of joints, Arthritis, Gout, Osteoporosis

Nervous system and special senses: organization of the nervous system, Structure & Properties of Neuron ,Cell bodies, Axons, Dendrites, Nerve Impulse, Type of Nerves, Central Nervous System including Brain & Spinal Cord. Peripheral Nervous System & autonomic nervous system.

Structure and function of eye, ear, tongue and nose.

**Endocrine System:** Structure, function, regulation & secretion of the following glands, hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, thymus, pancreas, testes and ovary. Basic concepts about hypo and hyper secretion of hormones and their diseases

### **UNIT-5**

Structure and function of male and female reproductive organ, function of testicular and ovarian hormones. Gametogenesis (oogenesis and spermatogenesis), menstrual cycle, implantation, pregnancy, menopause and various contraceptive measures

Body fluids and their significance: Important terms, types of body fluid, total body water, general principles for fluid balance, cardinal principle, Homeostasis through fluid maintenance, Electrolytes & ions, Function of electrolytes.

**Learning Outcome-** At the end of the course the student will be able to explain the physiological aspects of normal growth and development describe the physiological response and adaptations to environmental stresses and know the physiological principles underlying pathogenesis of disease.

#### **TEXT BOOKS:-**

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

#### **REFERENCE BOOKS:-**

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

# FIRST SEMESTER

## COURSE/PAPER - GENERAL BIOCHEMISTRY

**PAPER CODE: BCO-S-103**

L	T	P	C
2	-	2	3

**Learning Objective-** To enable the students to understand the Structure, function and inter-relationship of biomolecules and consequences of deviation from normal.

### UNIT 1

Carbohydrates-

Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function)

### UNIT 2

Proteins -Amino acids, peptides, and proteins (general properties & tests with a few examples like glycine, tryptophan, glutathione, albumin, hemoglobin, collagen)

### UNIT 3

Lipids-

Fatty acids, saturated and unsaturated, cholesterol and triacylglycerol, phospholipids and plasma membrane

### UNIT 4

Vitamins

General with emphasis on A,B2, C, E and inositol (requirements, assimilation and properties)

### UNIT 5

Minerals--Na, K, Ca, P, Fe, Cu and Se.(requirements, availability and properties)

**Learning outcome-** At the end of the course, the students should be able to demonstrate his knowledge and understanding on various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

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

# FIRST SEMESTER

## COURSE/PAPER - GEOMETRICAL OPTICS I

**PAPER CODE: BCO-S-104**

L	T	P	C
4	-	2	5

**Learning Objective-** The objective of this course is to equip the students with a thorough knowledge nature of light, and properties of mirrors and lenses.

### UNIT 1

**Nature of light-** light as electromagnetic oscillation; speed of light in vacuum and other media; Wavefronts spherical, elliptical and plane.

**Reflection and refraction of light-** laws of reflection and refraction. Total internal reflection.

**Refractive index** -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles

### UNIT 2

- Plane mirror and spherical mirror- convex and concave mirror
- Reflection by a spherical mirror
- paraxial approximation; sign convention
- Imaging by concave mirror and convex mirror
- Reflectivity; transmissivity ; Snell's Law, Refraction at a plane surface Glass slab

### UNIT 3

**Definition** of crown and flint glasses; materials of high refractive index

**Prism-** Angle of prism; deviation produced by a prism; refractive index of the prism , definition of Prism dioptre and application of prism.

**Dispersion** - Angular dispersion; dispersive power

### UNIT 4

- Vergence of light – convergence and divergence
- Vergence at a distance formula ; effectivity of a refracting surface
- 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

- Newton's formula
- linear magnification; angular magnification

## **UNIT 5**

- Imaging by a thin convex lens and thin concave lens; image properties (real/virtual; erect/inverted magnified/minified) for various object positions
- System of two thin lenses; review of front and back vertex powers and equivalent Power, review of six cardinal points.
- System of more than two thin lenses; calculation of equivalent power using magnification formula

**Learning Outcome-** At the end of the course, the students will be able to differentiate between different types of the lenses and different lens system with their application.

### **TEXT BOOK:**

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

### **REFERENCE BOOKS:**

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

# FIRST SEMESTER

## COURSE/PAPER - NUTRITION

**PAPER CODE: BCO-S-105**

L	T	P	C
2	-	-	2

**Learning Objective-** To enable the students to understand the basic aspects of Nutrition for good health. It also includes nutrients & nutrient derivatives relevant to health, nutrition deficiency and disease.

### UNIT 1

**Introduction-** History of Nutrition as a science Food groups, RDA Balanced diet, diet planning. Assessment of nutritional , status

**Energy-**Units of energy and value of food Measurements Energy expenditure, Total en energy/calorie requirement for different age groups and diseases. Limitations of the daily food guide. Satiety value

### UNIT 2

**Proteins** - 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

**Fat-** Sources and function, Essential fat, Excess and deficiency, Lipids and the eye. Hyperlipidemia, heart diseases, atherosclerosis.

### UNIT 3

**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 4

**Vitamin,** 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 5**

Essential amino acids and Miscellaneous

Measles and associated eye disorders, low birth weight

**Learning Outcome-** At the end of this course, the student will gain the knowledge of Balanced Diet, Protein, Carbohydrates, Vitamins, minerals, etc.

### **TEXT BOOK:**

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

### **REFERENCE BOOKS:**

1. No recommendation. It is left to the faculty.

## FIRST SEMESTER

### \* COURSE/PAPER- ENGLISH COMMUNICATION & SOFT SKILLS – I

**PAPER CODE: BCO-S-199**

L	T	P	C
3	-	2	4

**Objective: To comprehend and communicate in simple English**

#### **Module -1: Introduction to English language (4 Lectures)**

- a) Role and significance of English language in the present scenario
- b) English Language: Its relevance for the Indian industry
- c) Introduction to Listening, Speaking, Reading, Writing (LSRW) and benchmarking of the class

[Note: As part of classroom activity, a guest lecture from an industry representative/Director (CRC) and maintaining progress card for each student on LSRW for future reference]

#### **Module -2: Phonetics& Functional Grammar (14 Lectures)**

- a) Pronunciation and daily usage correction (speak with differences between p/b, s/sh, f/ph, t/d, v/w sounds)
- b) Parts of speech, articles, tenses, verbs and modals
- c) Practice of daily use words, numerals and tongue twisters
- d) Vocabulary building, Construction of simple sentences: Basic sentence pattern, subject and Predicate

[Note: As part of classroom activity, language games, tongue & jaw exercises, simple passages from the newspapers for oral drills in the classroom and practice tests (written and oral)]

#### **Module -3: English Communication- About Myself (14 Lectures)**

- a) Let's talk, making conversation, meeting and greeting
- b) Introducing myself, my family and my friends
- c) My opinions, my likes and dislikes

d) Life at college, hostel and workplace

[Note: As part of classroom activity, use the Work book for reference for classroom and home assignments, carry out practice tests (written and oral)]

**Module -4: Personality Development-I**

**(8 Lectures)**

a) First impression: Dressing sense, good manners, speaking well and respectably

b) Positive Attitude: Being happy and alert, a good listener and a good friend

c) Consultation among peers: Soliciting advice and giving advice

d) Goal setting, confidence building& handling rejection

[Note: As part of classroom activity, refer Work book for classroom and home assignments, carry out practice tests (written and oral)]

**Learning Outcome:**

1. Students will realise the significance of English for their career progression
2. Benchmarking the students in the first semester to observe their progression in terms of LSRW
3. Students will be able to understand distinct sounds and improve pronunciation
4. Students will improve their English vocabulary of daily usage
5. Students will be able to form simple sentences to talk about themselves, friends and relatives.
6. Students will be able to imbibe the pre-requisites of personality development.

**Reference Books:**

ILFS Bi-lingual Course in Basic English, ILFS Skill Development Corporation  
English Grammar Composition & Usage by J.C. Nesfield, Macmillan Publishers  
The Business letters by Madan Sood, Goodwill Publishing House, New Delhi  
Communication Skills by Sanjay Kumar &PushpLata, Oxford University Press

# **FIRST SEMESTER**

## **COURSE/PAPER- GENERAL ANATOMY PRACTICAL**

**SUBJECT CODE: BCO-S-151**

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

Course/Paper: General Anatomy Practical

### **Course Contents:**

Demonstration of -

1. Major organs through models and permanent slides.
2. Parts of circulatory system from models.
3. Parts of respiratory system from models.
4. Digestive system from models.
5. Excretory system from models.
6. Nervous system from models.
7. Structure of eye and ear
8. Structural differences between skeletal, smooth and cardiac muscles.
9. Various bones
10. Various joints
11. Various parts of male & female reproductive system from models

# **FIRST SEMESTER**

## **COURSE/PAPER- GENERAL PHYSIOLOGY PRACTICAL**

### **SUBJECT CODE: BCO-S-152**

1. To measure pulse rate
2. To measure blood pressure
3. Demonstration of ECG
4. To perform Hemoglobin by CMG method.
5. To perform Total RBC count.
6. To perform total leucocyte count.
7. To perform differential leucocyte count.
8. To perform PCV
9. To calculate Red cell indices

# FIRST SEMESTER

## COURSE/PAPER- GENERAL BIO CHEMISTRY PRACTICAL

**SUBJECT CODE: BCO-S-153**

1. Reactions of monosaccharides, disaccharides and starch:

- i. Glucose            Fructose
- ii. Galactose        Maltose, lactose
- iii. Sucrose           Starch

2. Analysis of Unknown

**Sugars Estimation:**

- i. Photometry            Biofluid of choice – blood, plasma, serum
- ii. Standard graphs      Glucose
- iii. Proteins                Urea
- iv. Creatinine              Bilirubin

# **FIRST SEMESTER**

## **COURSE/PAPER - GEOMETRICAL OPTICS-I PRACTICAL**

### **SUBJECT CODE: BCO-S-154**

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

# SECOND SEMESTER

## COURSE/PAPER- OCULAR ANATOMY

PAPER CODE: BCO-S-201

L	T	P	C
3	-	2	4

**Learning Objective-** To enable the students to develop the basic concept of gross, functional and applied anatomy of various structures of the eye and adnexa

### UNIT 1

- Central nervous system: A brief Introduction
- Spinal cord and brain stem
- Cerebellum and Cerebrum
- Embryology of the Eye

### UNIT 2

- Orbit and adnexa
- Eye Ball

### UNIT 3

- Eye Lid
- Conjunctiva
- Cornea
- Sclera
- Anterior chamber

### UNIT 4

- Uvea
- Crystalline Lens

### UNIT 5

- Vitrous
- Choroid
- Retina

**Learning Outcome-** At the end of the course the student will develop the sense of co-relation between different ocular structures on the basis of its location and functional aspects.

#### **TEXT BOOK:**

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,

# SECOND SEMESTER

## COURSE/PAPER- OCULAR PHYSIOLOGY

PAPER CODE: BCO-S- 202

L	T	P	C
3	-	2	4

**Learning objective:** To enable the students to understand the normal functioning of all structures of the eye and adnexa.

### UNIT 1

- Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe
- Extrinsic eye muscles, their actions and control of their movements
- Coats of the eye ball
- Cornea
- Aqueous humor and vitreous: Intra ocular pressure

### UNIT 2

- Iris and pupil
- Crystalline lens and accommodation, Mechanism of accommodation – presbyopia
- Retina – structure and functions
- Vision – general aspects of sensation
- Pigments of the eye and photochemistry

### UNIT 3

- The visual stimulus, refractive errors
- Visual acuity, Vernier acuity and principle of measurement
- Visual perception – Binocular vision, stereoscopic vision, optical illusions
- Visual pathway, central and cerebral connections
- Colour vision and colour defects. Theories and diagnostic tests

### UNIT 4

- Introduction to electro physiology
- Scotopic and Photopic vision
- Color vision, Color mixing
- Retinal sensitivity and Visibility

### UNIT 5

- Receptive stimulation and flicker
- Ocular, movements and saccades
- Visual perception and adaptation
- Introduction to visual psychology (Psychophysics)

**Learning Outcome:** At the end of the course the student will be able to explain the physiological aspects of normal development of the eye and understand physiological principles underlying pathogenesis and treatment of diseases of the eye.

**TEXT BOOK:**

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, 20012. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

## SECOND SEMESTER

### COURSE/PAPER- OCULAR BIOCHEMISTRY

PAPER CODE: BCO-S-203

L	T	P	C
2	-	2	3

**Learning objective:** To enable the students to understand structure, function and interrelationship of biomolecules and consequences of deviation from the normal

#### UNIT 1

Hormones basic concepts in metabolic regulation with examples say insulin

#### UNIT 2

Metabolism: General whole body metabolism (carbohydrates, proteins, lipids)

#### UNIT 3

**Ocular Biochemistry:** Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (The important chemicals in each and their roles.) Immunology of anterior segment

#### UNIT 4

**Technique:** Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry. Radio isotopes: application in medicine and basic research.

#### UNIT 5

**Clinical Biochemistry:** Blood sugar, urea, creatinine and bilirubin significance of their estimation.

**Learning Outcome:** At the end of the course the student will be able to explain principles of various conventional and specialized laboratory investigations and understand metabolic processes taking place in different ocular structures

#### **TEXT BOOK:**

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

#### **REFERENCE BOOKS:**

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

## SECOND SEMESTER

### COURSE/PAPER - PHYSICAL OPTICS

PAPER CODE: BCO-S-204

L	T	P	C
2	-	-	2

**Learning objective:** The objective of this course is to equip the students with a thorough knowledge of the nature and properties of light.

#### UNIT 1

**Nature of light-** light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. Sources of light; Electromagnetic Spectrum. Polarized light; linearly polarized light; and circularly polarized light

#### UNIT 2

Intensity of polarized light Malus' Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity

#### UNIT 3

Coherence- Interference; constructive interference, destructive interference; fringes; fringe width. Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc

#### UNIT 4

Resolution of an instrument, Telescope, for example), Raleigh's criterion, Scattering; Raleigh's scattering; Tyndall effect, Fluorescence and Phosphorescence

#### UNIT 5

Basics of Lasers, Coherence; population inversion; spontaneous emission; Einstein's theory of lasers. Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy y curves; photometric units Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination; Trolands

**Learning outcome:** At the end of this course, students will be able to predict the distribution of light under various conditions.

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

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

## SECOND SEMESTER

### COURSE/PAPER - GEOMETRICAL OPTICS II

PAPER CODE: BCO-S-205

L	T	P	C
2	-	2	3

**Learning objective:** The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses.

#### UNIT 1

Vergence and vergence techniques revised, schematic and reduced eyes, visual acuity  
Emmetropia and ametropia

#### UNIT 2

Blur retinal Imaginary, Correction of spherical ametropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic, Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.

#### UNIT 3

Aperture stops- entrance and exit pupils., Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens

#### UNIT 4

Accommodation, Accommodation formulae and calculations, Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.

#### UNIT 5

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

**Learning outcome:** 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.

## SECOND SEMESTER

### COURSE/PAPER- COMPUTER FUNDAMENTALS, INTERNET, & MS-OFFICE

PAPER CODE: BCO-S-206

L	T	P	C
3	-	2	4

**Learning Objective:** To give the basic knowledge of Computer hardware, Internet and application software with DOS keys to the students.

#### UNIT 1

**Introduction and Definition of Computer:** Computer Generation, Characteristics of Computer, Advantages and Limitations of a computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary) Memory Hierarchy. Hardware: a) Input Devices- Keyboard, Mouse, Scanner, Bar Code Reader b) Output Devices – Visual Display Unit (VDU), Printers, Plotters etc. Software: Introduction, types of software with examples, Introduction to languages, Compiler, Interpreter and Assembler. Number System: Decimal, Octal, Binary and Hexadecimal Conversions, BCD, ASCII and EBCDIC Codes. **(Lecture08)**

#### UNIT 2

**MS – DOS:** Getting Started on DOS with Booting the System, Internal Commands: CHDIR(CD),CLS, COPY, DATE, DEL(ERASE), DIR, CHARACTER, EXIT,MKDIR(MD), REM, RENAME(REN), RMDIR(RD), TIME, TYPE, VER, VOL, External Commands: ATTRIB, CHKDSK, COMMAND, DOSKEY, EDIT, FORMAT,HELP, LABEL, MORE, REPLACE, RESTORE, SORT, TREE, UNDELETE, UNFORMAT,XCOPY.

**Introduction of Internet:** History of internet, Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails. **(Lecture 08)**

#### UNIT 3

**MS Word:** Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge. **(Lecture 08)**

#### UNIT 4

**MS Excel:** Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text wrapping , Sorting data, Auto Sum, Use of functions, Cell Referencing form, Generating graphs, Worksheet data and charts with WORD, Creating Hyperlink to a WORD document, Page set up, Print Preview, Printing Worksheets.

**MS Power Point:** Starting MS–Power Point,, Creating a presentation using auto content Wizard,

Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents. MS – Access: creating table and database.

**(Lecture 08)**

## **UNIT 5**

**MS-POWERPOINT:** Starting MS–Power Point., Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents.

**(Lecture 08)**

### **Learning outcomes:**

After studying this course, you should be able to:

1. Understand the fundamental hardware components that make up a computer's hardware and the role of each of these components
2. Understand the difference between an operating system and an application program, and what each is used for in a computer
3. Describe some examples of computers and state the effect that the use of computer technology has had on some common products
4. Be familiar with software applications
5. Understand file management
6. Accomplish creating basic documents, worksheets, presentations with their properties.
7. Experience working with email and recognize email netiquette.

### **Text Books:**

1. Sinha P.K., Computer Fundamentals, BPB Publishing.
2. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing.
3. Leon A. & Leon M., Introductions to Computers, Vikas Publications.

### **Reference Books:**

1. Peter Norton\_s, Introductions to Computers, Tata McGraw Hill.
2. Price Michael, Office in Easy Steps, TMH Publication.

**\*Latest editions of all the suggested books are recommended.**

## SECOND SEMESTER

### \*COURSE/PAPER- ENGLISH COMMUNICATION & SOFT SKILLS – II

PAPER CODE: BCO-S-299

L	T	P	C
3	-	2	4

**Learning objective:** To build vocabulary, make simple sentences and communicate freely in simple English and overall professional development

#### Module -1: Basic Communication & Soft Skills

(6 Lectures)

- a) Review and recap of last semester
- b) Reading comprehension
- c) Building conversational skills
- d) Verbal & Non-verbal communication

[Note: As part of classroom activity, review and recap the last semester and carry out (oral and written) practice test to update the progress card of each student, refer to the Workbook]

#### Module -2: Vocabulary: Building Blocks

(10 Lectures)

- a) Word Formation: Prefix, suffix, conversion and compounding
- b) Homophones and one-word substitution
- c) Words often confused and misused
- d) Idiomatic phrase, Antonyms and Synonyms

[Note: As part of classroom activity, organise and learning language games, initiate the learning of 5 new words per class]

#### Module-3: English Communication: World around Me

(12 Lectures)

- a) Market place, Bus stop, Bank, Post Office
- b) Village, Town and City
- c) Eating out: Stall, Dhaba and Restaurant

[Note: As part of classroom activity, refer Work book for classroom and home assignments, carry out practice tests (written and oral)]

#### **Module -4: Personality Development-II**

**(12 Lectures)**

- a) Etiquettes: Telephone, e-mail and at a wedding or social gathering
- b) Public dealing: Making enquiries and requesting for help, handling difference of opinion, giving directions, instructions and getting assistance
- c) Expressions: Giving compliments, making complaints, Feeling sorry and saying thank you
- d) Entertainment: Radio, music, television, and computers

[Note: As part of classroom activity, refer Workbook for classroom and home assignments, carry out practice tests (written and oral)]

#### **Learning outcome:**

1. Gradual but significant improvement in student's progression in terms of LSRW to be noted
2. Students will improve their English vocabulary of daily usage
3. Students will be able to understand the world around them and communicate in diverse situations
4. Students will be able to imbibe the requisites of personality development for demonstrating good manners in society
5. Students will be able to exhibit basic etiquettes of personal communication

#### **Reference Books:**

1. ILFS Bi-lingual Course in Basic English, ILFS Skill Development Corporation
2. English Grammar Composition & Usage by J.C. Nesfield, Macmillan Publishers
3. The Business letters by Madan Sood, Goodwill Publishing House, New Delhi
4. Communication Skills by Sanjay Kumar & PushpLata, Oxford University Press
5. Newspapers

## **SECOND SEMESTER**

### **COURSE/PAPER-OCULAR ANATOMY PRACTICAL**

**PAPER CODE: BCO-S-251**

1. Practical dissection of bull's eye
2. **Orbit:** Practical demonstration of orbital structure

## **SECOND SEMESTER**

### **COURSE/PAPER-OCULAR PHYSIOLOGY PRACTICAL**

**PAPER CODE: BCO-S-252**

1. Lid movements
2. Tests for lacrimation tests
3. Extra ocular movements
4. Break up time
5. Pupillary reflexes
6. Applanation tonometry
7. Schiotz tonometry.
8. Measurement of accommodation and convergence
9. Visual acuity measurement.
10. Direct ophthalmoscopy
11. Indirect ophthalmoscopy
12. Retinoscopy
13. Light and dark adaptation.
14. Binocular vision( Stereopsis)

## **SECOND SEMESTER**

### **COURSE/PAPER-OCULAR BIOCHEMISTRY PRACTICAL**

**PAPER CODE: BCO-S-253**

1. Quantitative analysis
2. Abnormal constituents in urine, sugar proteins, ketones, blood and bile salts.
3. Techniques of detection of abnormal constituents of urine:
4. Electrophoresis
  - a. Chromatography, Preparation of normal, molar and percentage solutions.
  - b. Preparation of buffers, pH determination
5. Demonstration
  - a. Estimation of blood cholesterol Estimation of alkaline phosphatase.
  - b. Salivary amylase (effect of ph, etc) Milk analysis

## **SECOND SEMESTER**

### **COURSE/PAPER -GEOMETRICAL OPTICS II PRACTICAL**

#### **PAPER CODE: BCO-S-254**

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

## **SECOND SEMESTER**

### **COURSE/PAPER-COMPUTER FUNDAMENTALS, INTERNET & MS-OFFICE PRACTICAL**

#### **PAPER CODE: BCO-S-255**

##### Computer fundamental and internet lab Practical

1. Using basic DOS commands.
2. Using external DOS commands
3. Creating a email account
4. Using web browser for searching and surfing.
5. Creating and formatting a document in MS office
6. Using autocorrect, auto text and spell check operation in MS office.
7. Create tables in MS Word.
8. Inserting different kinds of object in MS word.
9. Use main merge options in MS office.
10. Create an Excel work sheet with following options rows and columns alignment.
11. Using excel formulas.
12. Create a graph with available data in MS excel.
13. Create a PPT presentation using auto content wizard.
14. Use Clip art animation effects and word art galleries in presentations.
15. Using transition and setting timings for slide show.
16. Use MS access to create data base and tables.

**SECOND SEMESTER**  
**COURSE/PAPER- HOSPITAL POSTING**

**COURSE CODE: BCO-S-256**

- ❖ Students will gain additional skills in clinical procedures, interaction with patients and professional personnel.

## THIRD SEMESTER

### COURSE/ PAPER-OCULAR MICROBIOLOGY

**SUBJECT CODE- BCO-S-301**

L	T	P	C
2	-	-	2

**Learning Objective-** To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites

#### UNIT -1

- Morphology and principles of cultivating bacteria

#### UNIT -2

- Sterilization and disinfections used in laboratory and hospital practice

#### UNIT- 3

- Common bacterial infections of the eye.

#### UNIT -4

- Common fungal infections of the eye

#### UNIT -5

- Common viral infections of the eye.
- Common parasitic infections of the eye.

**Learning Outcome-**At the end of the course, the students will be able to understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and basic principles of diagnostic ocular Microbiology.

#### **TEXT BOOK**

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

#### **REFERENCE BOOKS:**

1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology
2. Sydney m. Finegold & ellen jo baron: Diagnostic Microbiology (DM) 5)

# THIRD SEMESTER

## COURSE/ PAPER - VISUAL OPTICS I

**SUBJECT CODE- BCO-S-302**

L	T	P	C
2	-	-	2

**Learning Objective-** To understand the fundamentals of optical components of the eye

### UNIT- 1

- Review of Geometrical Optics: Vergence and power
- object space and image space
- Sign convention
- Spherical refracting surface
- Spherical mirror
- Cardinal points
- Magnification
- Light and visual function
- Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization.
- Spherical and chromatic aberration, application of chromatic aberration.

### UNIT- 2

- Optics of Ocular Structure
- Cornea and aqueous
- Crystalline lens , Vitreous
- Schematic and reduced eye

### UNIT-3

- Measurements of Optical Constants of the Eye
- Corneal curvature and thickness
- Keratometry
- Curvature of the lens and ophthalmophakometry
- Axis and angle of the eye

### UNIT -4

- Basic Aspects of Vision
- Visual Acuity
- Light and Dark Adaptation
- Spatial and Temporal Resolution
- Science of Measuring visual performance and application to Clinical Optometry

## **UNIT- 5**

- Refractive anomalies and their causes
- Etiology of refractive anomalies
- Population distributions of anomalies.
- Optical component measurements
- Growth of the eye in relation to refractive errors

**Learning Outcome-**At the end of the course, the students will have theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction

### **TEXT BOOK:**

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

### **REFERENCE BOOKS:**

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
4. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

## THIRD SEMESTER

### COURSE/ PAPER - OPTOMETRIC OPTICS-I

SUBJECT CODE- BCO-S-303

L	T	P	C
2	-	2	3

**Learning objective-** To enable the students to gain thorough knowledge of different types of lenses used in optometry and ophthalmology and to measure the power of the lens using conventional technique.

#### **UNIT -1**

**Introduction** –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**

Lenses –Definition, units, terminology used to describe, form of lenses  
Vertex distance and vertex power, Effectivity calculations

#### **UNIT -3**

Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical  
Transpositions –Simple, Toric and Spherical equivalent

#### **UNIT- 4**

Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinder lenses  
Spherometer & Sag formula, Edge thickness calculations

#### **UNIT -5**

Magnification in high plus lenses, Minification in high minus lenses  
Tilt induced power in spectacles  
Aberration in Ophthalmic Lenses

**Learning objectives-** At the end of the course, the students will be able to transpose different types of lens prescription and identify different types of lenses along with their application in ophthalmology and optometry.

**TEXT BOOK:**

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

**REFERENCE BOOKS:**

1. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
4. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

## **THIRD SEMESTER**

### **COURSE/ PAPER-OPTOMETRIC INSTRUMENTS**

**SUBJECT CODE- BCO-S-304**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>-</b>	<b>2</b>	<b>3</b>

**Learning Objective-** To enable the students to gain thorough knowledge of optics, and application of the various optometric and ophthalmic instruments

#### **UNIT- 1**

- Refractive instruments
- Test charts standards.
- Choice of test chart
- Trial case lenses
- Refractor (phoropter) head unit
- Trial frame design
- Near vision difficulties with units and trial frame
- Retinoscope – types available
- Adjustment of Retinoscopes- special features
- Objective optometers.

#### **UNIT- 2**

- Infrared optometer devices.
- Projection charts
- Illumination of the consulting room.
- Brightness acuity test
- Vision analyzer
- Pupilometer
- Potential Acuity Meter
- Abberometer

#### **UNIT -3**

- Ophthalmoscopes and related devices
- Design of ophthalmoscopes – illumination, Filters for ophthalmoscopy
- Indirect ophthalmoscope

## **UNIT -4**

- Lensometer, Lens gauges or clock
- Slit lamp
- Tonometers
- Keratometer and corneal topography

## **UNIT – 5**

- Refractometer
- Orthoptic Instruments (Synaptophore Only)
- Color Vision Testing Devices
- Fields of Vision And Screening Devices
- A Scans (Details)
- Only Short Introduction-
- B Scan, ERG, VEP, OCT

**Learning outcome-** At the end of the course, the students will be able to operate different optometric and ophthalmic instruments and analyse their respective report.

### **TEXT BOOK:**

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

### **REFERENCE BOOKS:**

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

## THIRD SEMESTER

### COURSE/ PAPER -- OCULAR DISEASE I

SUBJECT CODES-BCO-S-305

L	T	P	C
3	-	2	4

**Learning Objective-**To enable the students to gain knowledge about the etiology, clinical features, investigation and complications of anterior segment ocular disorders.

#### UNIT-1

- Orbit, Applied Anatomy
- Ptosis (Classification, Causes, Investigations)
- Enophthalmos
- Lids-Applied Anatomy
- Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)
- Oedema of the eyelids(Inflammatory, Solid, Passive edema)
- Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion ,Internalhordeolum, Molluscum Contagiosum)
- Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).

#### UNIT- 2

- Lacrimal System
- Applied Anatomy
- Tear Film
- The Dry Eye ( Sjogren's Syndrome)
- Dacryocystitis & Dacryoadenitis

#### UNIT -3

- Conjunctiva
- Applied Anatomy
- Inflammations of conjunctiva ( Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis)
- Degenerative conditions( Pinguecula, Pterygium, Concretions)
- Symptomatic conditions( Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration)
- Cysts and Tumors

## **UNIT -4**

- Cornea-Applied Anatomy and Physiology
- Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea)
- Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative)
- Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic)
- Degenerations ( Arcus senilis, Vogt's white limbal girdle, Hassal-henle bodies, Band shaped keratopathy, Salzmann's nodular degeneration, Pellucid Marginal degeneration)
- 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)
- Keratoconus, Keratoglobus

## **UNIT – 5**

- Uveal Tract and Sclera
- Applied Anatomy,
- Classification of uveitis-Etiology, Pathology, clinical features and management.
- Endophthalmitis
- Panophthalmitis
- Pars Planitis
- Episcleritis and scleritis
- Clinical examination of Uveitis and Scleritis
- Crystalline lens- Dislocation, opacification, subluxation and surgical management.

**Learning Outcome-**At the end of the course, the students will be able to approach correct diagnosis and management of the anterior segment ocular disorder.

### **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

# THIRD SEMESTER

## COURSE/ PAPER- CLINICAL EXAMINATION OF THE VISUAL SYSTEM

SUBJECT CODE- BCO-S-306

L	T	P	C
2	-	-	2

**Learning Objective-** To enable the students to perform various clinical optometry and ophthalmic procedure used for anterior and posterior segment evaluation.

### UNIT 1

- History taking
- Visual acuity estimation
- Extraocular motility, Cover test, Alternating cover test
- Hirschberg test, Modified Krimsky

### UNIT 2

- Pupils Examination
- Maddox Rod
- Van Herrick
- External examination of the eye, Lid Eversion

### UNIT 3

- Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),
- Color Vision
- Stereopsis
- Confrontation test

### UNIT 4

- Photostress test
- Slit lamp biomicroscopy
- Ophthalmoscopy
- Tonometry

### UNIT 5

- ROPLAS
- Amsler test
- Contrast sensitivity function test
- Saccades and pursuit test

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

**TEXT BOOK:**

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, USA, 2007.

**REFERENCE BOOKS:**

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007
2. D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth-Heinemann, 2007

## THIRD SEMESTER

### COURSE/ PAPER - INDIAN MEDICINE AND TELEMEDICINE

SUBJECT CODE- BCO-S-307

L	T	P	C
2	-	-	2

**Learning Objective-**To make the students aware about the traditional and latest healthcare system.

#### UNIT – 1

- Introduction to healthcare delivery system
- 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

#### UNIT -2

- National Health Programme-Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.

#### UNIT -3

- Introduction to AYUSH system of medicine
- Introduction to Ayurveda.
- Yoga and Naturopathy
- Unani
- Siddha
- Homeopathy
- Need for integration of various system of medicine

#### UNIT – 4

- 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 -5**

- Epidemiology
  - Principles of Epidemiology  
Natural History of disease  
Methods of Epidemiological studies
  - Epidemiology of communicable & non-communicable diseases, disease transmission, host defence immunizing agents, cold chain, immunization, disease monitoring and surveillance

**Learning Outcome-** At the end of the course, the student will have basic knowledge about the telemedicine practices in India especially in eye care sector.

### **TEXT BOOK:**

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

## THIRD SEMESTER

### COURSE/PAPER -ENVIRONMENTAL SCIENCE

COURSE CODE: BCO-S-308

L	T	P	C
4	-	-	4

**Learning Objective:** To create awareness among students about environment protection.

#### UNIT 1

(Lectures 08)

Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development.

**Ecology and Environment:** Concept of an Ecosystem-its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid & Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.

#### UNIT 2

(Lectures 08)

**Natural Resources:** Renewable & Non-Renewable resources; Land resources and land use change; Land degradation, Soil erosion & desertification. **Deforestation:** Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources:** Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies.

**Biodiversity:** Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Bio-geographical Classification of India

#### UNIT 3

(Lectures 08)

**Environmental Pollutions:** Types, Causes, Effects & control; Air, Water, soil & noise pollution, Nuclear hazards & human health risks, Solid waste Management; Control measures of urban & industrial wastes, pollution case studies

#### UNIT 4

(Lectures 08)

**Environmental policies & practices:** Climate change & Global Warming (Greenhouse Effect), Ozone Layer -Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context

## **UNIT 5**

(Lectures 08)

### **Human Communities & Environment:**

Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case studies.

### **Field Work:**

1. Visit to an area to document environmental assets; river/forest/flora-fauna etc.
2. Visit to a local polluted site: urban/ rural/industrial/agricultural.
3. Study of common plants, insects, birds & basic principles of identification.
4. Study of simple ecosystem; pond, river etc.

**Learning Outcome-** Based on this course, the graduates will understand/evaluate/develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

### **Text Books:**

1. "Environmental Chemistry", De, A. K., New Age Publishers Pvt.Ltd.
2. "Introduction to Environmental Engineering and Science", Masters, G. M., Prentice Hall India Pvt. Ltd.
3. "Fundamentals of Ecology", Odum, E. P., W. B. Saunders Co.

### **Reference Books:**

1. "Biodiversity and Conservation", Bryant, P. J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

**\*Latest editions of all the suggested books are recommended**

## THIRD SEMESTER

### COURSE/PAPER- ENGLISH COMMUNICATION & SOFT SKILLS-III

**COURSE CODE: BCO-S-399**

L	T	P	C
3	-	2	4

**Learning Objective:** To learn job oriented, presentation and interview skills and business Correspondence.

#### **Module -1 Functional Grammar-II**

**(8 Lectures)**

- a) Sentence construction: Simple, Complex and Compound
- b) Application writing
- c) Paragraph writing, essay writing and precis writing
- d) Pre-testing of oral and writing skills

*[Note: As part of classroom activity, Review and recap of last semester and update progress of each student refer Module 3 of Workbook]*

#### **Module-2 Professional Skills**

**(14Lectures)**

- a) Biodata, CV and resume writing
- b) Joining Letter, Cover Letter & Resignation letter
- c) Inter-Office Memo, Formal Business Letter, Informal Notes
- d) Minutes of the Meeting, Reporting Events, Summary Writing

*[Note: As part of classroom activity, use of standard templates and scenario buildings, practice sessions in classroom and homework assignments, refer to Workbook]*

#### **Module -3Presentation Skills**

**(10Lectures)**

- a) Power-point presentations & presentation techniques
- b) Body language
- c) Describing people, places and events
- d) Extempore speech and Just-a minute sessions

*[Note: As part of classroom activity, practice sessions carried out in class on different topics of the domain expertise, refer to Workbook]*

#### **Module -4Interview Skills**

**(8 Lectures)**

- a) Developing skill to (a) Debate (b) Discussion, Basics of GD & styles of GD
- b) Discussion in groups and group discussion on current issues
- c) Steps to prepare for an interview and mock interviews

*[Note: As part of classroom activity, language games, extensive coverage of contemporary issues for GDs, facing mock interview sessions with faculty, respective TPOs and Director CRC]*

**Learning Outcome:**

1. Considerable improvement in student's progression in terms of LSRW to be noted.
2. Students will improve their writing skills for official communication.
3. Students will be able to give presentation and extempore speech on select topics.
4. Students will be able to discuss among peers and participate in group discussions on current issues.

**Reference Books\*:**

1. ILFS Bi-lingual Course in Basic English, ILFS Skill Development Corporation
2. Communication Skills for Engineers and Scientists by Sangeeta Sharma & Binod Mishra, PHI Learning Private Limited, New Delhi.
3. Professional Communication by Malti Agarwal, Krishna Prakashan Media (P) Ltd., Meerut.
4. Communication Skills by Sanjay Kumar & PushpLata, Oxford University Press
5. The Business letters by Madan Sood, Goodwill Publishing House, New Delhi

## **THIRD SEMESTER**

### **COURSE/PAPER- OPTOMETRIC OPTICS-I PRACTICAL**

#### **COURSE CODE: BCO-S-351**

1. Measurement of lens power , lens centration using conventional techniques
2. Transposition of various types of lenses
3. Knowledge to identify different forms of lenses
  - a. (equi- convex, planoconvex, periscopic, etc.)
4. Knowledge to select the tool power for grinding process.
5. Measurement of surface powers using lens measure.
6. Method of laying off the lens for glazing process.

## **THIRD SEMESTER**

### **COURSE/PAPER- OPTOMETRIC INSTRUMENTS PRACTICAL**

**COURSE CODE: BCO-S-352**

1. Hands-on practice of the all major ophthalmic Instrument

## **THIRD SEMESTER**

### **COURSE/PAPER- OCULAR DISEAS –I PRACTICAL**

**COURSE CODE: BCO-S-353**

1. Visual Acuity chart/drum
2. Retinoscopy
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Biomicroscope
7. Tonometer: [Schiotz's, Applanation, Non Contact, Tonopen Tonometer,]
8. Keratometer
9. Lensometer
10. A – Scan Ultrasound
11. Color Vision [ishihara,]

## **THIRD SEMESTER**

### **COURSE/PAPER- HOSPITAL POSTING**

#### **COURSE CODE: BCO-S-354**

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

# FOURTH SEMESTER

## COURSE/ PAPER- OPTOMETRIC OPTICS II & DISPENSING OPTICS

**SUBJECT CODE- BCO-S-401**

L	T	P	C
4	-	2	5

**Learning objective-**The objective is to equip the students with through knowledge of different types, materials, tints, properties, coating of spectacle lenses as well as different frames.

### UNIT -1

- Spectacle Lenses
- Manufacture of glass
- Lens materials
- Lens surfacing
- Principle of surface generation and glass cements
- Terminology used in Lens workshop
- Lens Quality
- Lens properties
- Methods of Inspecting the quality of lenses

### UNIT -2

- Spectacle Frames
- Types and part
- Classification of spectacle frames-material, weight, temple position
- Coloration
- Frame selection
- Frame & lens measurements and selection

### UNIT – 3

- Tinted & Protective Lenses
- Characteristics of tinted lenses Absorptive Glasses
- Safety lenses-Toughened lenses, Laminated Lenses, CR 39 Polycarbonate Lenses
- Reflection from spectacle lenses - ghost images

#### **UNIT – 4**

- Multifocal Lenses- Introduction, history and development, types
- Bifocal lenses, Trifocal & Progressive addition lenses
- Reflections in bifocals at the dividing line
- Marking and measurement in dispensing optics.

#### **UNIT – 5**

- Antireflection coating, Mirror coating, Hard Multi Coating [HMC],
- Spectacle magnifiers
- Lenticular & Aspherical lenses
- Special types of spectacle
- Industrial safety glasses
- Frame availability in Indian market
- Soft skills and professional communication with Patient and Customers

**Learning Outcome-** At the end of the course, the students will be able to dispense different lens according to the requirement as well as perform facial measurement and marking related to dispensing optics.

#### **TEXT BOOK/REFERENCE BOOKS:**

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

## FOURTH SEMESTER

### COURSE/ PAPER- VISUAL OPTICS II

SUBJECT CODE- BCO-S- 402

L	T	P	C
3	-	-	3

**Learning objective-** To enable the students to understand the fundamentals of optical components of the eye

#### UNIT- 1

- Accommodation & Presbyopia
- Far and near point of accommodation
- Range and amplitude of accommodation
- Anomalies of accommodation
- Presbyopia

#### UNIT- 2

- Convergence
- Type, Measurement and Anomalies
- Relationship between accommodation & convergence (AC/A ratio)

#### UNIT- 3

- Objective refraction ( Static & Dynamic)
- 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
- Principle and fogging
- Fixed astigmatic dial(Clock dial),Combination of fixed and rotator block test),J.C.C dial(Fan )
- Duochrome test
- Binocular balancing- alternate occlusion, prism dissociation, dissociate
- Duochrome balance, Borish dissociated fogging

## **UNIT -5**

- Effective Power & Magnification
- Ocular refraction vs. Spectacle refraction
- Spectacle magnification vs. Relative spectacle magnification
- Axial vs. Refractive Ametropia, Knapp's law
- Ocular accommodation vs. Spectacle accommodation
- Retinal image blur-Depth of focus and depth of field

**Learning Objective-** At the end of the course, the students will have theoretical knowledge and practical; skills on visual acuity measurement, objective and subjective refraction.

### **TEXT BOOK/REFERENCE BOOKS:**

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

# FOURTH SEMESTER

## COURSE/ PAPER- OCULAR DISEASE II

SUBJECT CODE- BCO-S- 403

L	T	P	C
5	-	-	5

**Learning Objective-**To enable the students to gain knowledge about the etiology, clinical features, investigation and complications of posterior segment ocular disorders.

### UNIT- 1

- Vitreous-Applied Anatomy & physiology
- Vitreous opacities, degeneration and inflammation
- Vitreous haemorrhage
- Vitreous detachment
- Surgical management of vitreous disorder.

### UNIT -2

- Choroid and Retina-Applied Anatomy & physiology
- Disorder of choroid.
- Congenital disorder of retina
- Inflammatory disorder of retina
- Vascular disorder of retina
- Retinopathies
- Retinal detachment
- Tumours of the retina
- Surgical management of the retinal disorders.

### UNIT -3

- Ocular Injuries
- Closed Globe Injuries
- Open Globe Injuries
- Mechanical Injuries
- Non Mechanical Injuries
- Clinical approach towards ocular injury patients

### UNIT- 4

- Clinical Neuro-ophthalmology
- Anatomy of visual pathway
- Lesions of the visual pathway
- Pupillary Reflex & Abnormalities
- Optic neuritis, ischaemic and non-ischemic optic neuropathy, Pappilloedema, optic atrophy ,

- Cortical blindness Malingering  
Nystagmus

## **UNIT- 5**

- Glaucoma
- 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(suspect, intermittent glaucoma, acute congestive and chronic angle closure)
- Secondary glaucoma
- Management-Common medications, laser intervention and surgical techniques.

**Learning Outcome-**At the end of the course, the students will be able to approach correct diagnosis and management of the anterior segment ocular disorder.

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

### **REFERENCE BOOKS:**

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

# FOURTH SEMESTER

## COURSE/ PAPER- PATHOLOGY

SUBJECT CODE- BCO-S-404

L	T	P	C
2	-	-	2

**Learning objective-** To teach the students basic aspects of disease processes with reference to specific entities relevant in optometry/ophthalmology.

### UNIT - 1

- Inflammation and repair
- Infection in general

### UNIT - 2

- Specific infections
- Tuberculosis
- Leprosy
- Syphilis
- Fungal infection
- Viral chlamydial infection

### UNIT - 3

- Neoplasia
- Haematology
- Anemia
- Leukemia
- Bleeding disorders

### UNIT - 4

- Circulatory disturbances
- Thrombosis
- Infarction
- Embolism
- Clinical pathology
- Interpretation of urine report
- Interpretation of blood smears.

## **UNIT -5**

- Immune system
- Shock, Anaphylaxis.
- Allergy

**Learning Outcome-** At the end of the course students will have the knowledge in Inflammation and repair aspects as well as the Pathology of various eye parts and adnexa.

### **TEXT BOOK**

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

### **REFERENCE BOOKS:**

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

## FOURTH SEMESTER

COURSE/ PAPER - BASIC AND OCULAR PHARMACOLOGY

SUBJECT CODE- BCO-S-405

L	T	P	C
3	-	-	3

**Learning objective-**The objective of the course is to covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.

### UNIT -1

**General Pharmacology:** Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factor modifying drug

### UNIT- 2

**Systemic pharmacology-** ANS, drugs affecting pupillary size and light reflex, intraocular tension, Accommodation.

**General & local anesthetics, Chemotherapy:** Introduction on general chemotherapy, specific chemotherapy Antiviral, antifungal, antibiotics; steroids, Anti-diabetics; Blood Coagulants

### UNIT 3

**Ocular Pharmacology:** Ocular preparations, Ocular pharmacokinetics, methods of drug administration and special drug delivery system, Ocular toxicology.

### UNIT 4

**Diagnostic & Therapeutic applications of drugs used in Ophthalmology:** Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedure Anti-glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal.

## **UNIT 5**

Drugs used in allergic, inflammatory & degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes and anti-oxidants.

**Learning Outcome-**At the end of the course, the students have thorough knowledge of the basic principle of pharmacokinetics & Pharmacodynamics as well as the Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and 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
3. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

### **REFERENCE BOOKS:**

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

## FOURTH SEMESTER

### COURSE/ PAPER - INTRODUCTION TO QUALITY AND PATIENT SAFETY

SUBJECT CODE- BCO-S-406

L	T	P	C
2	-	-	2

**Learning Objective-** To enable the students to have knowledge on various aspects of quality and safety issues in health care services.

#### UNIT- 1

- Quality assurance and management

#### UNIT- 2

- Basics of emergency care and life support skills

#### UNIT- 3

- Biomedical waste management and environment safety

#### UNIT- 4

- Infection and prevention control

#### UNIT- 5

- Antibiotic resistance
- Disaster preparedness and management

**Learning Outcome-** At the end of the course, students have gained introductory knowledge about quality and patient safety aspects from Indian perspectives

**TEXT BOOKS:** Faculty to recommend

**REFERENCE BOOKS:** Faculty to recommend

# FOURTH SEMESTER

## COURSE/ PAPER - MEDICAL PSYCHOLOGY

**SUBJECT CODE- BCO-S-407**

L	T	P	C
2	-	-	2

**Learning Objective-** The objective of this course is to cover various aspects of medical psychology essential for the optometrist.

### **UNIT- 1**

- Introduction to Psychology
- Intelligence Learning, Memory, Personality, Motivation

### **UNIT- 2**

- Body Integrity – one's body image
- The patient in his Milen

### **UNIT- 3**

- The self-concept of the therapist, Therapist-patient relationship – some guidelines
- Illness, its impact on the patient

### **UNIT- 4**

- Maladies of the age and their impact on the patient's own and others concept of his body image

### **UNIT- 5**

- Adapting changes in Vision
- Why Medical Psychology demands commitment

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

### **TEXT BOOK:**

1. Patricia Barkway. Psychology for health professionals, 2<sup>nd</sup> edition, Elsevier, 2013

## FOURTH SEMESTER

### COURSE/ PAPER - ENGLISH COMMUNICATION & SOFT SKILLS-IV

**SUBJECT CODE- BCO-S-499**

L	T	P	C
3	-	2	4

**Learning Objective:** To inculcate behavioural skills in students for the Corporate World

**Module -1 Fundamentals of Time Management & Managing Change (12 Lectures)**

- a) Time Management
- b) Managing People and managing change
- c) Team building, Leadership and taking decisions
- d) Stress Management

[Note: As part of classroom activity, refer to the Workbook, guest lecture by management faculty]

**Module -2 Public Speaking (8 Lectures)**

- a) Art of public speaking
- b) Welcome speech
- c) Farewell Speech
- d) Vote of thanks

[Note: As part of classroom activity, extensive practice sessions in class and home assignments]

**Module -3 Personality Development-III (8 Lectures)**

- a) Rude vs. Polite Behavior
- b) Ethics and human values
- c) Concern for environment
- d) Crisis Management

[Note: As part of classroom activity, refer to the Workbook, guest lecture by management faculty and industry representative]

## **Module -4Oral Practice**

**(12 Lectures)**

- a) Debate
- b) Just-a-minute
- c) Group Discussions
- d) Mock Interviews

*[Note: As part of classroom activity, extensively test the oral skills and update the progress card of each student]*

### **Learning Outcome:**

1. Notable improvement in student's progression in terms of LSRW.
2. Students will be able to imbibe good practices of self-discipline and professionalism required in the corporate world.
3. Students will be able to develop the art of public speaking.
4. Students will be able to learn behavioural skills suitable for the corporate world.

### **Reference Books\*:**

1. ILFS Bi-lingual Course in Basic English, ILFS Skill Development Corporation
  2. Communication Skills for Engineers and Scientists by Sangeeta Sharma & Binod Mishra, PHI Learning Private Limited, New Delhi.
  3. Professional Communication by Malti Agarwal, Krishna Prakashan Media (P) Ltd., Meerut.
  4. Communication Skills by Sanjay Kumar & PushpLata, Oxford University Press
- The Business letters by Madan Sood, Goodwill Publishing House, New Delhi

## **FOURTH SEMESTER**

### **COURSE/ PAPER- OPTOMETRIC OPTICS-II & DISPENSING PRACTICAL**

#### **SUBJECT CODE- BCO-S-451**

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

## **FOURTH SEMESTER**

### **COURSE/ PAPER - HOSPITAL POSTING**

#### **SUBJECT CODE- BCO-S-452**

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

# FIFTH SEMESTER

## COURSE/ PAPER-CONTACT LENS I

PAPER CODE-BCO-S-501

L	T	P	C
4	-	2	5

**Learning objective:** To enable the students to have knowledge in both theoretical and practical aspects of Contact Lenses.

### UNIT 1

- Introduction to Contact lenses
- Definition and Classification
- History of Contact Lenses
- Optics of Contact Lenses
- Magnification & Visual field
- Accommodation & Convergence
- Back & Front Vertex Power / Vertex distance calculation
- Review of Anatomy & Physiology of Tear film
- Cornea
- Lids & Conjunctiva

### UNIT 2

- Introduction to CL materials
- Monomers, Polymers
- Properties of CL materials
- Physiological (Dk, Ionicity, Water content)
- Physical (Elasticity, Tensile strength, Rigidity)
- Optical (Transmission, Refractive index)
- Indications and contraindications
- Parameters / Designs of Contact Lenses & Terminology

### UNIT 3

- RGP Contact Lens materials
- Manufacturing Rigid and Soft Contact Lenses – various methods
- Pre-Fitting examination – steps, significance, recording of results
- Correction of Astigmatism with RGP lens

## **UNIT 4**

- Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses
- Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses
- Calculation and finalising Contact lens parameters
- Ordering Rigid Contact Lenses – writing a prescription to the Laboratory
- Checking and verifying Contact lenses from Laboratory

## **UNIT 5**

- Modifications possible with Rigid lenses
- Common Handling Instructions
- Insertion & Removal Techniques
- Do's and Dont's
- Care and Maintenance of Rigid lenses
- Cleaning agent & Importance
- Rinsing agents & Importance
- Disinfecting agents & importance
- Lubricating & Enzymatic cleaners
- Follow up visit examination
- Complications of RGP lenses

**Learning Outcome-**At the end of the course, the students will be able to understand the basics of contact lens as well as its fitting and assessment.

### **TEXT BOOKS:**

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

**FIFTH SEMESTER**  
**COURSE/ PAPER-LOW VISION CARE**

**PAPER CODE-BCO-S-502**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>-</b>	<b>2</b>	<b>4</b>

**Learning objective:** To enable the students to have knowledge about epidemiology 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.

**UNIT 1**

- Definitions & classification of Low vision
- Epidemiology of low vision
- Model of low vision service

**UNIT 2**

- Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision
- types of low vision aids – optical aids, non-optical aids & electronic devices
- Optics of low vision aids

**UNIT 3**

- Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training
- Pediatric Low Vision care

**UNIT 4**

- Low vision aids – dispensing & prescribing aspects
- Visual rehabilitation & counselling

**UNIT 5**

- Legal aspects of Low vision in India
- Case Analysis

**Learning Outcome-**At the end of the course, the student will be knowledgeable in the Clinical examination of Low vision subjects as well as prescribing Optical, Non-Optical, Electronic, and Assistive devices.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

# FIFTH SEMESTER

## COURSE/ PAPER -GERIATRIC OPTOMETRY & PEDIATRIC OPTOMETRY

PAPER CODE-BCO-S-503

L	T	P	C
3	-	2	4

**Learning Objective-**The objective of the course is to provide the students with the knowledge of general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients and spectacle dispensing aspects in ageing patients as well as the development of the eye and vision, vision assessment and management of vision disorder in pediatric patients.

### UNIT 1

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

### UNIT 2

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

### UNIT 3

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

## **UNIT 4**

- Determining binocular status
- Determining sensory motor adaptability
- Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia
- Remedial and Compensatory treatment of Strabismus and Nystagmus
- Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetic.

## **UNIT 5**

- Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism
- Spectacle dispensing for children
- Paediatric contact lenses
- Low vision assessment in children

**Learning Outcome-**At the end of the course, the students will be able to examine and manage pediatric as well as geriatric patients.

### **TEXT BOOKS:**

1. A.J. ROSSENBLOOM Jr & M.W.MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.
2. Pediatric Optometry - JEROME ROSNER, Butterworth, London 1982
3. Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004

### **REFERENCE BOOKS:**

1. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
2. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002
4. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis, 1980
5. Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
6. Clinical pediatric optometry. LJ Press, BD Moore, Butterworth- Heinemann, 1993

# FIFTH SEMESTER

## COURSE/ PAPER -BINOCULAR VISION- I

**PAPER CODE-BCO-S-504**

L	T	P	C
3	-	-	3

**Learning objective-** The objective of the course is to provide the students the basics of Binocular Vision and its clinical co-relation.

### UNIT 1

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

### UNIT 2

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

### UNIT 3

- Near Vision Complex Accommodation
- Definition and mechanism (process).
- Methods of measurement.
- Stimulus and innervation.

- Types of accommodation.
- Anomalies of accommodation – aetiology and management.

#### **UNIT 4**

- Convergence
- Definition and mechanism.
- Methods of measurement.
- Types and components of convergence - Tonic, accommodative, fusional, proximal  
Anomalies of Convergence – aetiology and management.
- Sensory adaptations
- Confusion

#### **UNIT 5**

- Suppression- investigation and management
- Blind spot syndrome
- Abnormal Retinal Correspondence
- Investigation and management
- Blind spot syndrome
- Eccentric Fixation-investigation and management
- Amblyopia-classification, etiology, investigations and management.

**Learning Outcome-**At the end of the course, the students will be able to demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extra ocular muscles as well as the etiology, investigation and management of anomalies of binocular vision.

#### **TEXT BOOKS:**

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

## FIFTH SEMESTER

### COURSE/ PAPER -SYSTEMIC DISEASES

PAPER CODE-BCO-S-505

L	T	P	C
3	-	-	3

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

#### UNIT 1

**Hypertension-**Definition, classification, Epidemiology, clinical examination, complications, and management, Hypertensive retinopathy

**Diabetes Mellitus--**Classification, path physiology, clinical presentations, diagnosis, and management, Complications, Diabetic Retinopathy

**Thyroid Disease--**Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors, Grave's Ophthalmopathy

**Acquired Heart Disease-**Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm, Ophthalmic considerations

#### UNIT 2

**Cancer:** Incidence, Etiology, Therapy, Ophthalmologic, considerations

**Connective Tissue Disease-** Rheumatic arthritis, Scleroderma, 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

Herpes virus (Herpes simplex, Varicella Zoster, Cytomegalovirus), Herpes and the eye

Hepatitis (Hepatitis A, B, C)

Acquired Immunodeficiency Syndrome

## **UNIT 4**

Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations)

Common Tropical Medical Ailments

- Malaria
- Typhoid
- Dengue
- Onchocerciasis
- Cysticercosis
- Leprosy
- Nutritional and Metabolidisorders:
  - Kwashiorkor
  - Vitamin Deficiency
  - Myasthenia Gravis

## **UNIT 5**

First Aid

Genetics-Introduction to genetics, Chromosome structure and cell division, Gene structure and basic principles of Genetics, Genetic disorders and the eye

**Learning Outcome-** At the end of this course the student will be able to manage the ocular manifestation of various systemic diseases

### **TEXT BOOKS:**

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

## FIFTH SEMESTER

### COURSE/ PAPER -RESEARCH METHODOLOGY & BIostatISTICS

PAPER CODE-BCO-S-506

L	T	P	C
2	-	-	2

**Learning Objective-** 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.

#### UNIT 1

- Introduction to research methods
- Identifying research problem

#### UNIT 2

- Ethical issues in research
- Research design

#### UNIT 3

- Types of Data
- Research tools and Data collection methods

#### UNIT 4

- Sampling methods
- Developing a research proposal

#### UNIT 5

**Introduction of Biostatistics-** Measures of Morality, Sampling, Statistical significance, Correlation, Sample size determination.

**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) Hospital Statistics Use of computerized software for statistics

**Learning outcome-** At the end of the course the student will be aware of the basic research methodology, collection and analysis of data.

**TEXT BOOKS:**

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

## **FIFTH SEMESTER**

### **COURSE/ PAPER -CONTACT LENS-I PRACTICAL**

#### **PAPER CODE-BCO-S-551**

1. Measurement of Ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and TBUT
4. Schirmer's test, Slit lamp examination of tear layer
5. Keratometry
6. Placido's disc
7. Soft Contact Lens fitting – Aspherical
8. Soft Contact Lens fitting – Lathecut lenses
9. Soft Contact Lens over refraction
10. Lens insertion and removal
11. Lens handling and cleaning
12. Examination of old soft Lens
13. RGP Lens fitting
14. RGP Lens Fit Assessment and fluorescein pattern
15. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus)
16. RGP over refraction and Lens flexure
17. Examination of old RGP Lens
18. RGP Lens parameters
19. Slit lamp examination of Contact Lens wearers

## **FIFTH SEMESTER**

### **COURSE/ PAPER -LOW VISION CARE PRACTICAL**

**PAPER CODE-BCO-S-552**

#### **Practical 1:**

1. Attending in low vision care clinic and history taking.

#### **Practical 2:**

1. Determining the type of telescope and its magnification (Direct comparison method & calculated method)
2. Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.

#### **Practical 3:**

1. Inducing visual impairment and prescribing magnification.
2. Determining reading speed with different types of low vision aids with same magnification.
3. Determining reading speed with a low vision aid of different magnifications.

## **FIFTH SEMESTER**

### **COURSE/ PAPER -GERIATRIC OPTOMETRY & PEDIATRIC OPTOMETRY PRACTICAL**

**PAPER CODE-BCO-S-553**

1. Deals with hand-on session the different geriatric and paediatric evaluation techniques.

## **FIFTH SEMESTER**

### **COURSE/ PAPER - HOSPITAL POSTING**

#### **PAPER CODE-BCO-S-554**

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

# SIXTH SEMESTER

## COURSE/ PAPER -CONTACT LENS II

PAPER CODE-BCO-S-601

L	T	P	C
3	-	2	4

**Learning Objective** – The objective of the course is to provide suitable knowledge to the students regarding theoretical as well as practical aspects of Contact Lenses

### UNIT 1

- SCL Materials & Review of manufacturing techniques
- Comparison of RGP vs. SCL
- Pre-fitting considerations for SCL

### UNIT 2

- Fitting philosophies for SCL
- Fit assessment in Soft Contact Lenses: Types of fit – Steep, Flat, Optimum
- Calculation and finalising SCL parameters  
6.1 Disposable lenses
- Advantages and availability

### UNIT 3

- Soft Toric CL- Stabilization techniques, Parameter selection
- Fitting assessment
- Common Handling Instructions- Insertion & Removal Techniques, Do's and Don'ts
- Care and Maintenance of Soft lenses  
Cleaning agents & Importance

### UNIT 4

- Rinsing agents & Importance
- Disinfecting agents & importance
- Lubricating & Enzymatic cleaners
- Follow up visit examination
- Complications of Soft lenses

## **UNIT 5**

- Therapeutic contact lenses- Indications
- Fitting consideration
- Specialty fitting Aphakia
- Pediatric
- Post refractive surgery
- Management of Presbyopia with Contact lenses

**Learning outcome:** At the course of the course the student will be able to understand the basics, types, properties, design and adverse effects of contact lenses.

### **TEXT BOOKS:**

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

# SIXTH SEMESTER

## COURSE/ PAPER -BINOCULAR VISION-II

PAPER CODE-BCO-S-602

L	T	P	C
3	-	2	4

**Learning objective-** The objective of this course is to inculcate the student with the knowledge of different types of strabismus, its etiology, clinical features, necessary investigations and management.

### UNIT 1

- Neuro-muscular anomalies- Classification and etiological factors
- History – recording and significance.

### UNIT 2

**Convergent strabismus-** Accommodative convergent squint-Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management

**Divergent Strabismus-**Classification, A& V phenomenon, Investigation and Management

### UNIT 3

**Vertical strabismus-**Classification, Investigation and Management

**Paralytic Strabismus--**Classification, Investigation and Management

Distinction from comitant and restrictive Squint

### UNIT 4

#### **Investigations**

- History and symptoms
- Head Posture
- Diplopia Charting
- Hess chart
- PBCT
- Nine directions
- Binocular field of vision
- Amblyopia and Treatment of Amblyopia
- Nystagmus

## **UNIT 5**

- Non-surgical Management of Squint
- Restrictive Strabismus
- Features
- Musculo- fascical anomalies
- Duane's Retraction syndrome
- Clinical features and management
- Brown's Superior oblique sheath syndrome
- Strabismus fixus
- Congenital muscle fibrosis
- Surgical management

**Learning outcome-** At the end of the course the student will be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

### **TEXT BOOKS:**

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

## SIXTH SEMESTER

### COURSE/ PAPER -PUBLIC HEALTH AND COMMUNITY OPTOMETRY

PAPER CODE-BCO-S-603

L	T	P	C
2	-	-	2

**Learning objective-** The Objective of this course is to provide proper knowledge about the prevalence of various eye diseases and community based eye care system in India.

#### UNIT 1

- 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

#### UNIT 2

- Eye in primary health care
- Contrasting between Clinical and community health programs
- Community Eye Care Programs
- Community based rehabilitation programs

#### UNIT 3

- Nutritional Blindness with reference to Vitamin A deficiency
- Vision 2020: The Right to Sight
- Screening for eye diseases
- National and International health agencies, NPCB

#### UNIT 4

- Role of an optometrist in Public Health
- Organization and Management of Eye Care Programs – Service Delivery models
- Health manpower and planning & Health Economics
- Evaluation and assessment of health programmes

## **UNIT 5**

- 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

**Learning outcome-** At the end of the course the student will have enough knowledge about health education programs and Vision screening for various eye diseases in the community for different age groups.

### **TEXT BOOKS:**

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

### **REFERENCE BOOKS:**

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

# SIXTH SEMESTER

## COURSE/ PAPER -PRACTICE MANAGEMENT

PAPER CODE-BCO-S-604

L	T	P	C
2	-	-	2

**Learning objective-**The objective of this course is to provide knowledge regarding business, accounting, taxation, professional values, and quality and safety aspects of optometry practice management.

### 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

### UNIT 3

- Taxation and taxation planning

### UNIT 4

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

## **UNIT 5**

- 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

**Learning Outcome-** At the end of the course, student would have gained knowledge on various aspects of private optometric practice from Indian perspective.

**TEXT BOOKS:** Faculty to recommend

**REFERENCE BOOKS:** Faculty to recommend

## SIXTH SEMESTER

### COURSE/ PAPER -OCCUPATIONAL OPTOMETRY

PAPER CODE-BCO-S-605

L	T	P	C
2	-	-	2

**Learning objective**-The objective of this course is to provide knowledge of general aspects of occupational health, Visual demand in various jobs, task analyzing method, visual standards for various jobs, occupational hazards and remedial aspects.

#### **UNIT 1**

Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. - Acts and Rules - Factories Act, WCA, ESI Act.

#### **UNIT 2**

**Electromagnetic Radiation** and its effects on Eye

**Light** – Definitions and units, Sources, advantages and disadvantages, standards

**Color** – Definition, Color theory, Color coding, Color defects, Color Vision tests

#### **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

**Learning Outcome-**At the end of the course the students will be knowledgeable in visual requirements of jobs, effects of physical, chemical and other hazards on eye and vision; and will also be able to prescribe suitable corrective lenses and eye protective glasses.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

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

# SIXTH SEMESTER

## COURSE/ PAPER-MEDICAL LAW AND ETHICS

PAPER CODE-BCO-S-606

L	T	P	C
2	-	-	2

**Learning Objective-** To enable the students to have ample knowledge regarding the medical laws and ethics regulating medical practice.

### UNIT 1

- Medical ethics - Definition - Goal - Scope
- Introduction to Code of conduct

### UNIT 2

- Basic principles of medical ethics –Confidentiality
- Malpractice and negligence - Rational and irrational drug therapy

### UNIT 3

- Autonomy and informed consent - Right of patients
- Care of the terminally ill- Euthanasia

### UNIT 4

- 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.

### UNIT 5

- Professional Indemnity insurance policy
- Development of standardized protocol to avoid near miss or sentinel events
- Obtaining an informed consent.

**Learning Outcome-**At the end of the course, the students will be competent enough to understand the legal framework increasing awareness about the rights of patients in a medical setup.

**TEXT BOOKS:** Faculty to recommend

**REFERENCE BOOKS:** Faculty to recommend

## **SIXTH SEMESTER**

### **COURSE/ PAPER -RESEARCH PROJECT 1**

**PAPER CODE-BCO-S-607**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
-	-	4	2

- ❖ Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Student will get the experience of doing a research in systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing and presentation
- ❖ Project is spread through sixth to eighth semester.

## **SIXTH SEMESTER**

### **COURSE/ PAPER -CONTACT LENS II PRACTICAL**

#### **PAPER CODE-BCO-S-651**

1. Examination of old soft Lens
  2. RGP Lens fitting
  3. RGP Lens Fit Assessment and fluroscein pattern
  4. Special RGP fitting (Aphakia, pseudo phakia&Keratoconus)
  5. RGP over refraction and Lens flexure
  6. Examination of old RGP Lens
  7. RGP Lens parameters
  8. Fitting Cosmetic Contact Lens
  9. Slit lamp examination of Contact Lens wearers
  10. Fitting Toric Contact Lens
  11. Bandage Contact Lens
  12. SPM &Pachymetry at SN During Clinics
- Specialty Contact Lens fitting (at SN during clinics)

**SIXTH SEMESTER**  
**COURSE/ PAPER -BINOCULAR VISION II PRACTICAL**

**PAPER CODE-BCO-S-652**

1. Deals with hand-on session the basic binocular vision evaluation techniques.

## **SIXTH SEMESTER**

### **COURSE/ PAPER-PRACTICAL-HOSPITAL POSTING**

#### **PAPER CODE-BCO-S-653**

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