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
244001 Website: www.tmu.ac.in
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
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:

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<tr>
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<th>Internal</th>
<th>External</th>
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<td>Theory</td>
<td>40</td>
<td>60</td>
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<tr>
<td>Practical</td>
<td>50</td>
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English External Evaluation & Assessment:

The students will be evaluated on all four parameters of LSRW.

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<tr>
<th></th>
<th>External Exam</th>
<th>Internal Assessment</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>50</td>
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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.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Attendance</th>
<th>Viva+Record</th>
<th>Total Internal</th>
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<tbody>
<tr>
<td>(30 MARKS)</td>
<td>(10 MARKS)</td>
<td>(10 MARKS)</td>
<td>(50 MARKS)</td>
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</table>

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.

<table>
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<tr>
<th>Experiment</th>
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<th>Viva</th>
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<td>(30 MARKS)</td>
<td>(10 MARKS)</td>
<td>(10 MARKS)</td>
<td>(50 MARKS)</td>
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Internal Theory Assessment: 40

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<th>Assignments</th>
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<td>10</td>
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English Internal Theory Assessment: 50

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<tr>
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<th>Workbook Assignments &amp; Viva</th>
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<tbody>
<tr>
<td>20</td>
<td>10</td>
<td>10+10</td>
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</table>

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.

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<td>Clinical Observation and Report writing</td>
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<tr>
<td>2</td>
<td>Visual Acuity – Distance + Near</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>History taking</td>
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<td>General</td>
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<td>Conditions</td>
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<td>Visual Acuity – Distance + Near (log MAR)</td>
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<td></td>
<td>Pinhole acuity</td>
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<td>5</td>
<td>Extra ocular Motility</td>
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<tr>
<td>6</td>
<td>Cover test</td>
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<tr>
<td>7</td>
<td>Push up test (Amplitude of Accommodation)</td>
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<td>8</td>
<td>Push up test (Near point of Convergence)</td>
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<td>Stereopsis test</td>
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<td>Tear Break up time</td>
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<td>Amsler’s Grid test</td>
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<td>Color vision test</td>
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<td>Schiotz Tonometry</td>
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<td>Accommodative facility (+ 2.00 D)</td>
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<td>36</td>
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<td>35</td>
<td>Binocular Vision clinic</td>
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<td>Ophthalmology clinic</td>
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## Study and Evaluation Scheme

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

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<th>S. No.</th>
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<th>Subject</th>
<th>Periods</th>
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<td>BCO-S-103</td>
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<td>BCO-S-104</td>
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- 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)

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<tr>
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<th>Subject</th>
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<th>Credit</th>
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<td>Ocular Physiology</td>
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<td>3</td>
<td>BCO-S-203</td>
<td>Ocular biochemistry</td>
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<td>4</td>
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<td>5</td>
<td>BCO-S-205</td>
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<td>6</td>
<td>BCO-S-206</td>
<td>Computer Fundamentals, Internet, &amp; Ms-Office</td>
<td>3</td>
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- Subject marked with asterisk (*) is non-core paper.
### Study and Evaluation Scheme
#### B.Optom Semester- III (Second Year)

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<td>BCO-S-301</td>
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<td>BSC-S-302</td>
<td>Visual Optics - I</td>
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<td>BCO-S-303</td>
<td>Optometric Optics – I</td>
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<td>BCO-S-304</td>
<td>Optometric Instruments</td>
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<td>Clinical Examination Of Visual System</td>
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<td>BCO-S-307</td>
<td>Indian Medicine and Telemedicine</td>
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<td>BCO-S-308</td>
<td>Environmental Sciences</td>
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<td>13</td>
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<td>Hospital Posting</td>
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**TOTAL**

|     |             |                                              | 22 | 14 | 29 | 570 | 730 | 1300 |
### Study and Evaluation Scheme

**B.Optom Semester- IV (Second Year)**

<table>
<thead>
<tr>
<th>S.N O</th>
<th>Course Code</th>
<th>Subject</th>
<th>Periods</th>
<th>Credit</th>
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<td>BCO-S-402</td>
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<td>BCO-S-403</td>
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<td>4</td>
<td>BCO-S-404</td>
<td>Pathology</td>
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<td>5</td>
<td>BCO-S-405</td>
<td>Basic And Ocular Pharmacology</td>
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<td>6</td>
<td>BCO-S-406</td>
<td>Introduction To Quality And Patient Safety</td>
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</table>

**TOTAL**

|       |       |       |       |       | 24 | 10 | 29 | 430 | 570 | 1000 |

- Two Lectures to be assigned for Seminar / library
## Study and Evaluation Scheme
### B.Optom Semester- V (Third Year)

<table>
<thead>
<tr>
<th>S.N O.</th>
<th>Course Code</th>
<th>Subject</th>
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<th>Credit</th>
<th>Evaluation Scheme</th>
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<td>3  -  -</td>
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<td>BCO-S-503</td>
<td>Geriatric Optometry &amp; Pediatric Optometry</td>
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<td>BCO-S-504</td>
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<tr>
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<td>BCO-S-553</td>
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- **TOTAL**

- Six Lectures to be assigned for Group Discussion/Seminar /library
### Study and Evaluation Scheme

**B.Optom Semester- VI (Third Year)**

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<thead>
<tr>
<th>S.No.</th>
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<th>Evaluation Scheme</th>
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<td>3</td>
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<td>Public Health And Community Optometry</td>
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<td>4</td>
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- Eight Lectures to be assigned for Group Discussion/Seminar / library
### Study and Evaluation Scheme

#### B.Optom Semester- VII (Fourth Year)

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

COURSE/PAPER - GENERAL ANATOMY

PAPER CODE: BCO-S-101

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 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:**


**REFERENCE BOOKS:**


4. R. Kanagasuntharam, P. Sivananda-Singham & A. Krishnamurti:

FIRST SEMESTER

COURSE/PAPER- GENERAL PHYSIOLOGY-I

COURSE CODE: BCO-S-102

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**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

**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:**


**REFERENCE BOOKS:**

FIRST SEMESTER

COURSE/PAPER - GENERAL BIOCHEMISTRY

PAPER CODE: BCO-S-103

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</table>

Learning Objective- To enable the students to understand the Structure, function and inter-relationship of bimolecules 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:**


FIRST SEMESTER

COURSE/PAPER - GEOMETRICAL OPTICS I

PAPER CODE: BCO-S-104

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:


REFERENCE BOOKS:

FIRST SEMESTER

COURSE/PAPER - NUTRITION

PAPER CODE: BCO-S-105

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**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 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:

2. C Gopalan, BV Rama Sastry, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad, 2004

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

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, t/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
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

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:

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

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:**


**REFERENCE BOOKS:**

SECOND SEMESTER

COURSE/PAPER- OCULAR BIOCHEMISTRY

PAPER CODE: BCO-S-203

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


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:

SECOND SEMESTER

COURSE/PAPER - PHYSICAL OPTICS

PAPER CODE: BCO-S-204

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 raysRelationship 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:


REFERENCE BOOKS:

SECOND SEMESTER
COURSE/PAPER - GEOMETRICAL OPTICS II

PAPER CODE: BCO-S-205

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 dioptoric 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:

REFERENCE BOOKS:
SECOND SEMESTER

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

PAPER CODE: BCO-S-206

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

UNIT 1


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.  

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.  

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.  

**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:**


**Reference Books:**

1. Peter Norton_s, Introductions to Computers, Tata McGraw Hill.

*Latest editions of all the suggested books are recommended.*
SECOND SEMESTER

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

PAPER CODE: BCO-S-299

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**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
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
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
   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
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

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**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**
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

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:**


**REFERENCE BOOKS:**

THIRD SEMESTER
COURSE/ PAPER - OPTOMETRIC OPTICS-I

SUBJECT CODE- BCO-S-303

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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:


REFERENCE BOOKS:

THIRD SEMESTER
COURSE/ PAPER- OPTOMETRIC INSTRUMENTS

SUBJECT CODE- BCO-S-304

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:**

**REFERENCE BOOKS:**


THIRD SEMESTER
COURSE/ PAPER -- OCULAR DISEASE I

SUBJECT CODES-BCO-S-305

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
- Proptosis (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:

REFERENCE BOOKS:


THIRD SEMESTER
COURSE/ PAPER- CLINICAL EXAMINATION OF THE VISUAL SYSTEM

SUBJECT CODE- BCO-S-306

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 teat, 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:**


**REFERENCE BOOKS:**

THIRD SEMESTER
COURSE/ PAPER - INDIAN MEDICINE AND TELEMEDICINE

SUBJECT CODE- BCO-S-307

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
- Homoeopathy
- 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:**

THIRD SEMESTER
COURSE/PAPER - ENVIRONMENTAL SCIENCE

COURSE CODE: BCO-S-308

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.


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)
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:


Reference Books:

1. “BiodiversityandConservation”, Bryant, P. J., Hypertext Book

*Latest editions of all the suggested books are recommended
THIRD SEMESTER
COURSE/PAPER- ENGLISH COMMUNICATION & SOFT SKILLS-III

COURSE CODE: BCO-S-399

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  (14 Lectures)

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  (10 Lectures)

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
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.


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

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:

   Heinemann, 1996
3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth -
   Heinemann, 2007
   Heinemann, 2002
FOURTH SEMESTER
COURSE/ PAPER- VISUAL OPTICS II

SUBJECT CODE- BCO-S- 402

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:

2. Duke –Elder’s practice of Refraction
FOURTH SEMESTER

COURSE/ PAPER- OCULAR DISEASE II

SUBJECT CODE- BCO-S- 403

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 Mechnical 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.

(p) Ltd. Publishers, New Delhi, 2007

REFERENCE BOOKS:


   Butterworth-Heinemann, 2007
FOURTH SEMESTER

COURSE/ PAPER-  PATHOLOGY

SUBJECT CODE- BCO-S-404

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**


**REFERENCE BOOKS:**


FOURTH SEMESTER

COURSE/ PAPER - BASIC AND OCULAR PHARMACOLOGY

SUBJECT CODE- BCO-S-405

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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**


**REFERENCE BOOKS:**


FOURTH SEMESTER

COURSE/ PAPER - INTRODUCTION TO QUALITY AND PATIENT SAFETY

SUBJECT CODE- BCO-S-406

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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

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:
FOURTH SEMESTER

COURSE/ PAPER - ENGLISH COMMUNICATION & SOFT SKILLS-IV

SUBJECT CODE- BCO-S-499

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 -4 Oral 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  
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 ,
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,
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

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 Don’t’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
4. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
FIFTH SEMESTER
COURSE/ PAPER-LOW VISION CARE

PAPER CODE-BCO-S-502

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**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:


REFERENCE BOOKS:

FIFTH SEMESTER

COURSE/PAPER - GERIATRIC OPTOMETRY & PEDIATRIC OPTOMETRY

PAPER CODE-BCO-S-503

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:


REFERENCE BOOKS:

1. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002
FIFTH SEMESTER
COURSE/PAPER - BINOCULAR VISION- I

PAPER CODE-BCO-S-504

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:


3. Gunter K. V. Mosby Company

4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular VisionHeterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers
FIFTH SEMESTER
COURSE/ PAPER -SYSTEMIC DISEASES

PAPER CODE-BCO-S-505

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:


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

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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.
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:


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. Schrimer’s test, Slit lamp examination of tear laye
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

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
4. Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
SIXTH SEMESTER
COURSE/ PAPER -BINOCULAR VISION-II

PAPER CODE-BCO-S-602

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- fascial 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:**


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

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:**

3. K Park: Park’s Text Book of Preventive and Social Medicine, 19th edition,

**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

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

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


REFERENCE BOOKS:

1. G W Good: Occupational Vision Manual available in the following website:
   www.aoa.org
2. N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999
SIXTH SEMESTER
COURSE/ PAPER-MEDICAL LAW AND ETHICS

PAPER CODE-BCO-S-606

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

|xrhombus| 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
|xrhombus| Project is spread through sixth to eighth semester.

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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.