GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM) (Deemed to be University)

VISAKHAPATNAM * HYDERABAD * BENGALURU Accredited by NAAC with A⁺ Grade



REGULATIONS AND SYLLABUS OF

UPMED02: B.SC. OPTOMETRY

(w.e.f. 2022-23 admitted batch)

B.Sc. Optometry

(Effective from 2022-23 admitted batch)

1.0 ADMISSIONS

Admissions into B.Sc. Paramedical (Specialization in Optometry) program of GITAM (Deemed to be University) are governed by GITAM (Deemed to be University) admission regulations.

ELIGIBILITY CRITERIA

Eligibility:

Qualified in Intermediate or 10+2 equivalent examinations with 60% Aggregate marks in Physics, Chemistry, Biology and English or APOSS (Open school intermediate) with GPA 5.5 or equivalent.

About the course:

B.Sc. Optometry programme is a four-year programme in the science of eyesight care. This programme covers an examination, diagnosis, treatment, and management of illnesses and disorders of the visual system. The programme also includes a one-year required internship. With the help of our degree programme, students can pursue various optometry positions and develop their independent practices by opening their eye clinics, optical stores, lens production facilities, etc. Several scopes are available on the market nowadays for BSc in Optometry graduates. These graduates can work with ophthalmologists in hospital clinics, practice in optical settings, own optical businesses, and have fantastic employment prospects abroad. Graduates of the BSc in Optometry programme may also start optical lens production facilities. Students interested in furthering their education can enroll in M. Sc. and Ph. D. programmes in their respective disciplines and pursue a career in teaching.

Course Administration

The course is delivered in 6 semesters with each semester dealing with prescribed subjects.

- All subjects are mandatory for the student. The student is trained in both theory and practical/clinical aspects of the course. Student is assessed by formative and summative assessment every semester.
- ➤ There will be one internal exam before the semester-end exam. Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- ➤ A candidate shall be declared to have passed in the concerned subject, if he fulfils the following criteria
 - He / She secured 35% marks in the internal assessment and

- (a) He / She secured 40% marks in theory and
 - (b) 50% marks in practicals & viva and
- (c) 50% marks in theory, practical &viva put together in each subject separately. Course objectives and learning outcomes are specified leading to clarity on what a student would be able to do at the end of the program.

STRUCTURE OF THE PROGRAM

The Program consists of

- i. Foundation Course (FC)
- ii. Core Courses Compulsory (C)
- iii. Discipline Specific Electives (DSE)
- iv. Generic Electives (GE)
- v. Internship/ Project/ Training (Detailed Report to be submitted in the prescribed format)

Each academic year consists of two semesters. The curriculum structure of the BSc Paramedical program and the contents for various courses offered are recommended by the Board of Studies concerned and approved by the Academic Council.

MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English. The method of instruction shall comprise classroom lectures, guest lectures, demonstrations, presentations, role-play, group discussions, seminars, class tests, case analysis, situational analysis, practical training etc.

ATTENDANCE REQUIREMENTS

- ➤ A candidate must have not less than 75% attendance in theory and 80% in practicals separately.
- ➤ Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- > There will be one internal exam before the semester-end exam.
- ➤ Internal marks will be considered for eligibility for the semester exam but will not be added for the semester exam.

EVALUATION:

CONTINUOUS ASSESSMENT AND EXAMINATIONS

- > There will be one internal exam before the semester-end exam.
- ➤ Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- ➤ Internal marks will be considered for eligibility for the semester exam but will not be added for the semester exam.

EXAMINATION DURATION AND PATTERN

a. Anatomy, Biochemistry & Physiology, Microbiology, Pathology, Pharmacology, General Medicine, General Surgery & Parent Department-

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100 marks each
60 marks theory 40 marks (Practical 30 marks + viva 10 marks)
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(Community Medicine, English, Psychology, EVS, Computer carries 40 marks each (No Practicals, only Theory). Community Medicine (third & Fourth Semester will be for 50 Marks – 30 Marks Theory & 20 Marks Practicals)

- b. Pattern of question paper
- c. 60 marks paper Duration: 2 ½ Hours
 - 1 O Essay (1x 10m = 10 marks)
 - 2 Q to 5 Q Short notes (total 4 Q, $4 \times 5 \text{ m} = 20 \text{ marks}$)
 - 6 Q to 15 Q very short notes (total 10 Q, $10 \times 3m = 30$ marks)
- d. 40 marks paper Duration: 2 hours
 - 1 Q Essay question (1 \times 10 m = 10 marks)
 - $2 Q \text{ to } 4 Q \text{ Short notes } (3 Q \times 5 = 15 \text{marks})$
 - 5 Q to 9 Q Very short notes (5 Q x 3 m = 15marks)
- e. 30 Marks Paper Duration: 1 ½ Hours
 - 1 Q Essay (1 x 10 m = 10 marks)
 - 2 Q to 3 Q Short notes (total 2 Q \times 5 m = 10 marks)
 - 4 Q to 8 Q very short notes (total 5 Q x 2m = 10marks)

Criteria for the following subjects have exam at the college level only:

- Soft skills, First aid, Biotechnology and medical Physics, Patient Care. These subjects
 are included in the semester exam and the candidates shall be declared as passed only
 when they secure 35% marks in the internal exam.
 - > Community Medicine:

• The theory exam to be conducted in 3rd & 4th semesters, theory along with practicals in the 3rd & 4th semester.

> Paper Setting:

- Paper setting, paper valuation and practical examination is done by internal examiners from the 1st to 5th semesters.
- In the 6 th semester paper setting will be done by concerned subject experts. Paper valuation and practical examination will be conducted but 2 examiners one internal and one external examiner.

> Criteria for Examiner:

- Professor or Associate Professor or Assistant Professor with minimum of 4 years of teaching experience after post-graduation.
- Parent Department Subjects semester exams will be conducted from the 3rd semester onwards.

• Subjects for 1st semester exam

2nd Semester Exam

> Anatomy

Anatomy

> Physiology

Physiology

> Biochemistry

Biotechnology & medical physics

- > EVS
- > English
- > Psychology
- > Computers

<u>Grace Marks:</u> Maximum 5 marks can be awarded to one subject provided he passed all the other subjects or these 5 marks can be split for maximum 2 subjects. Provided the candidate has passed rest of the subjects.

- Qualifying marks to pass the semester exam.
- A candidate shall be declared to have passed the examination if.
 - He / She secured 35% marks in the internal assessment.
 - Anatomy, Physiology & Biochemistry (a) He / She secured 40% marks in theory. (b) 50% marks in practicals & viva (c) 50% marks in theory, practical &viva put together in each subject separately.
 - For Community Medicine, EVS, English, Psychology, computer He/ She should secure minimum 50% marks in theory.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To impart knowledge and skill in accordance with the requirement in basic medical sciences and paramedical specialty as relevant	
PEO 2	To impart training required to carry out necessary investigative procedures accurately to facilitate proper diagnosis and prognosis of diseases	
PEO 3	To train the student to perform routine as well as special investigative procedures in the concerned paramedical specialty	
PEO 4	To impart knowledge and practical training required to operate and maintain all equipment used in the concerned specialization	
PEO 5	To impart knowledge about communication skills, basic research skills, professionalism, and ethical aspects required in various health care settings for effective delivery of health care	

PROGRAMME OUTCOMES (POs)

PO1	To prepare a cadre of healthcare technologists who can effectively assist senior health professionals in the delivery of quality health services.
PO2	To prepare skilled paramedical human resources for all levels of the healthcare delivery system from primary to tertiary care level.
PO3	To train the students to carry out necessary procedures accurately and to facilitate proper diagnosis and prognosis of diseases.
PO4	To enable to perform routine as well as special investigative procedures in the concerned paramedical specialty.
PO5	To develop knowledge and skill in accordance with the demand in the field of paramedical specialty as applicable.
PO6	To enable to operate and maintain all types of equipment used in the concerned specialization.
PO7	To make capable to support advanced testing activities and Research.
PO8	To enable to work as Supervisor/Trainer/Teacher in the field of Paramedical sciences.
PO9	To enable to communicate and interact effectively with non-clinical and clinical persons in various healthcare environments
PO10	To be able to present oneself in an ethical and professional manner
PO11	To equip the paramedical staff with modern skills and knowledge to bring them at par with other national and international standards
PO12	Students who complete these programs will be able to work in both an individual and team environment

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the end of course the student will be able to:

PSO1	To know about basic organ systems, with special emphasis on the ocular and visual system, and their inter-relationships to the body as a whole.
PSO2	Understand the structures and processes contributing to the development of refractive error and other optical and perceptual abnormalities of the visual system.

PSO3	To know about Mechanisms of action of the various classes of pharmaceutical agents, their interactions and their safe and effective use for the treatment of diseases and conditions affecting the eye and visual system
PSO4	The optics of the eye and ophthalmic lens systems (including spectacles, contact lenses and low vision devices) used to correct refractive errors.
PSO5	To understand about Vision therapy, Low vision aids and other rehabilitative methods used for the management of common visual disorder
PSO6	To practice independently as a primary eye care practitioner and work in eye care services where ever ophthalmologist services not available for the benefit of society.
PSO7	To develop such professionals who will actively participate in community optometry such as national programs for the prevention of blindness and effectively organize and participate in vision screening eye camps to help controlling blindness
PSO8	To be able to become an entrepreneur as an optometrist.

STRUCTURE OF THE PROGRAMME

Semester-wise Structure

SEMESTER-I

S. No	Course Code	Course Title	Course Category
1	ANAT1001	ANATOMY – I	С
2	BCHE1001	BIOCHEMISTRY – I	С
3	PSGY1001	PHYSIOLOGY – I	С
4	LANG1141	ENGLISH	FC
5	PSYC1031	PSYCHOLOGY	FC
6	CSCI1301	COMPUTER BASICS	FC
7	ENVS1051	ENVIRONMENTAL SCIENCE	FC

SEMESTER-II

S.	Course Code	Course Title	Course
No.			Category
1	ANAT1011	ANATOMY – II	С
2	PSGY1011	PHYSIOLOGY – II	С
3	BTSC1041	BIOTECHNOLOGY & MEDICAL PHYSICS (Only Internal exam, no university exam)	FC

SEMESTER-III

S. No	Course Code	Course Title	Course Category
1	PHCG2001	PHARMACOLOGY - I	С
2	MIBG2001	MICROBIOLOGY - I	С
3	PATH2001	PATHOLOGY - I	С
4	CMED2001	COMMUNITY MEDICINE & (SOFT SKILLS)	С
5	NURS2001	BASICS OF PATIENT CARE (No Uni. Exam)	FC
6	OPTH2001	OPTOMETRY - I	С

SEMESTER: IV

S. No	Course Code	Course Title	Course Category
1	PHCG2011	PHARMACOLOGY - II	С
2	MIBG2011	MICROBIOLOGY - II	С
3	PATH2011	PATHOLOGY - II	С
4	CMED2011	COMMUNITY MEDICINE	С
5	OPTH2011	OPTOMETRY - II	С

SEMESTER: V

S. No	Course Code	Course Title	Course Category
1	GMED3001	GENERAL MEDICINE - I	С
2	GSUR3001	GENERAL SURGERY-I	С
3	OPTH3001	OPTOMETRY - III	С
4	OPTH3011	OPTOMETRY - IV	С

SEMESTER-VI

S. No	Course Code	Course Title	Course Category
1.	OPTH3023	OPTOMETRY - V	C
2.	OPTH3031	OPTOMETRY - VI	С
3.	OPTH3041	OPTOMETRY - VII	С

SYLLABUS

SEMESTER - I

S. No	Course	Course Title	Course Category
	Code		
1	ANAT1001	ANATOMY - I	С
2	BCHE1001	BIOCHEMISTRY - I	С
3	PSGY1001	PHYSIOLOGY - I	С
5	LANG1141	ENGLISH	FC
6	PSYC1031	PSYCHOLOGY	FC
7	CSCI1301	COMPUTER BASICS	FC
8	ENVS1051	ENVIRONMENTAL SCIENCE	FC

ANAT1001: Anatomy-I Semester-I

(with effect from 2022-23 admitted batch)

INTRODUCTION:

Anatomy deals with the structural organization of the human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture into the clinical domain. The department of anatomy is committed to providing quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides, and VARIOUS models provide the ideal environment to learn anatomy during the 1st year of their course.

COURSE OBJECTIVES:

 The objective of this subject is to provide an outline of anatomy to improve the students understanding of the technical and diagnostic procedures used, with special emphasis on applied aspects.

Syllabus

LEARNING OUTCOMES:

After completion of the course at the end of 1st year, the first semester, the student must be able to know the following:

a. Introduction of Anatomy & Cell, Tissues

- 1. Anatomical terminology
- 2. Name the cell organelles
- 3. Types of Cell divisions
- 4. Classification of bones
- 5. Parts of long bone
- 6. Blood supply of long bone.
- 7. Classification of muscles
- 8. Cardiac muscle.

b. Introduction to Histology & lungs

1. Classify of Epithelium.

- 2. Type of Cartilages.
- 3.. Histology of bone
- 4. Different Parts of the Pleura.
- 5. Describe The Surfaces, Borders And The Mediastinal Surface Of The Lungs.
- 6. Relations of right lung
- 7. Relations of left lung
- 8. Bronchopulmary segment of lung
- 9. Costo diaphragmatic recess
- 10. Hilum of lung
- 11. Histology of lung

c. Heart & Blood vessels

- 1. Describe the external feature of heart with a labelled diagram
- 2. Mention the openings of right atrium
- 3. Briefly on Internal features of heart
- 4. Types of circulation
- 5. Aorta & its branches
- 6. Coronary circulation
- 7. Chambers of the heart &its vessels
- 8. Papillary muscles

d. Limbs

- 1. Bones of Upper limb
- 2. Carpal bones
- 3. Name the muscles of Upper limb
- 4. Bones of Lower Limb
- 5. Tarsal bones
- 6. Median cubical vein
- 7. Name of nerves of lower limb

- 8. Name of the nerves of upper limb
- 9. Mention the arteries of upper limb
- 10. Mention the arteries of lower limb
- 11. Name the muscles and nerve of back of thigh
- 12. Deltoid muscle
- 13. Gluteus maximum

COURSE OUTCOMES:

- Explains knowledge on the basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides a foundation in completion of the course.
- Explain the anatomy and functions of various Tissues and cells, an organization of a cellular system.
- Understand the functioning of lungs, heart, and blood vessels.

References:

- 1. BD Chaurasia: Handbook of general anatomy
- 2. Textbook of Anatomy & Physiology by InduKhurana&Arushi
- 3. Textbook of Anatomy & Physiology by PR Ashalatha& G Deepa
- 4. Textbook of Anatomy & Physiology by Ashalatha N Nandedkar, Vijay D Joshi & Sadhana -3^{rd} edition

BCHE1001: BIOCHEMISTRY-I Semester-I

(with effect from 2022-23 admitted batch)

Introduction:

Biochemistry deals with the structures, bonding, functions, and interactions of biological macromolecules, such as proteins, nucleic acids, carbohydrates, and lipids. They provide the structure of cells and perform many of the functions associated with life. Biochemistry focuses on understanding the chemical basis which allows biological molecules to give rise to the processes that occur within living cells and between cells, in turn relating greatly to the understanding of tissues and organs, as well as organism structure and function.

Course Objectives:

• Students must understand the basic principles of Biochemistry and the biochemical processes that take place in the human body and their applied aspects.

Syllabus: THEORY – 40HRS PRACTICAL -20HRS

CONTENT		
Cell biology	i. Recall the structure and functions of the cell and cell membrane.	
	ii. Explain various types of absorptions	
	iii. List intracellular organelles and mention their functions	
	iv. Explain cytoskeleton	
Carbohydrate	i. Define carbohydrates, classify carbohydrates with examples, explain glycosidic	
Chemistry	bond	
	ii. Illustrate structure, composition, sources, properties and functions of	
	monosaccharides, disaccharides, oligosaccharides, and polysaccharides.	
	iii. Explain glycosaminoglycan (mucopolysaccharides)	
Lipid	i.Define and classify lipids	
Chemistry	ii.Define, classify and list properties & functions of Fatty acids, Triacylglycerol,	
	Phospholipids, cholesterol	
	iii.Elaborate essential fatty acids and their importance	
	iv.Explain Lipoproteins: definition, classification, properties, sources and function and	
	ketone bodies	
Amino -acid	i.Define and classify amino acids	
Chemistry	ii.Define peptides and explain peptide bonds, list the biologically important peptides.	
	iii.Define and classify proteins, enumerate functions of proteins.	
Enzymes	i.Define and classify with examples, active site, cofactor, proenzyme	
	ii.List the factors affecting enzyme activity	
	iii.Define enzyme inhibition and talk about its significance	
	iv.Define isoenzymes, enzymology (clinical significance of enzymes)	
Nucleotide and	i.Show nucleotide composition and list functions of free nucleotides in body	
Nucleic acid	ii.Compare between DNA & RNA, explain structure and functions of DNA & RNA	
chemistry	(tRNA, rRNA, mRNA)	
Carbohydrate	i.Illustrate glycolysis-aerobic, anaerobic, citric acid cycle, substrate phosphorylation	
Metabolism	ii.Elaborate glycogen metabolism -glycogenesis, glycogenolysis, metabolic disorders of	
	glycogen, gluconeogenesis, Cori cycle	
	iii.Summarize hormonal regulation of glucose, glycosuria, diabetes mellitus	
Lipid	i.Explain lipid metabolism-lipolysis, oxidation of fatty acids	

ii.Explain lipogenesis- Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues iii.Elaborate ketone body metabolism: formation(ketogenesis), utilization(ketolysis), ketosis, Rothera's test iv.Summarize cholesterol metabolism: synthesis, degradation, cholesterol transport v.Define Hypercholesterolemia, list its effects, causing agents common hyperlipoproteinemia vi.Explain about fatty liver Amino acid and protein ii.Define Catabolism of amino acids- transamination, deamination ii.Illustrate fate of ammonia, transport of ammonia, Urea cycle iii.Outline the specialized products formed from amino acids i.Define vitamins and classify them according to solubility ii.List the sources, Coenzyme forms, functions, Recommended Dietary Allowance (RDA) iii.Tell about digestion, absorption and transport, deficiency and toxicity of individual vitamins i.Define minerals and list the sources for mineral and their Recommended Dietary Allowance ii.Tell about digestion, absorption, transport, excretion of various minerals iii.List the functions and disorders of individual minerals – Calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper Acid-base balance ii.Define acids, base and pH ii.Define buffers and describe buffer systems of the body (bicarbonate buffer system) iii.Elaborate about the role of lungs and kidneys in acid-base balance.			
iii.Elaborate ketone body metabolism: formation(ketogenesis), utilization(ketolysis), ketosis, Rothera's test iv.Summarize cholesterol metabolism: synthesis, degradation, cholesterol transport v.Define Hypercholesterolemia, list its effects, causing agents common hyperlipoproteinemia vi.Explain about fatty liver Amino acid i.Define Catabolism of amino acids- transamination, deamination ii.Illustrate fate of ammonia, transport of ammonia, Urea cycle iii.Outline the specialized products formed from amino acids Vitamins i.Define vitamins and classify them according to solubility ii.List the sources, Coenzyme forms, functions, Recommended Dietary Allowance (RDA) iii.Tell about digestion, absorption and transport, deficiency and toxicity of individual vitamins i.Define minerals and list the sources for mineral and their Recommended Dietary Allowance ii.Tell about digestion, absorption, transport, excretion of various minerals iii.List the functions and disorders of individual minerals – Calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper i.Define acids, base and pH ii.Define buffers and describe buffer systems of the body (bicarbonate buffer system)			
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balance ii.Define buffers and describe buffer systems of the body (bicarbonate buffer system)			
iii. Elaborate about the role of lungs and kidneys in acid-base balance.			
iii.Elaborate about the role of lungs and kidneys in acid-base balance.			
iv.Acid base disorders			
Water & i.Illustrate the water distribution in the body			
Electrolyte ii.Tell about body water, water turnover			
balance iii.Explain about regulation of water balance, role of ADH and thirst centre			
iv.Define osmolarity			
v.Illustrate distribution of electrolytes			
vi.Explain about electrolyte balance: Role of aldosterone, renin angiotensin system			
ANF			
Hemoglobin i.Describe briefly thenormal structure and function of Hemoglobin.			
Chemistry & ii.Hemoglobin synthesis and breakdown.			
Metabolism iii.List out the important abnormal hemoglobins and their effect			
i.Describe the biochemical functions of kidney and the principal Renal Function Tests			
TESTS ii.DescribethebiochemicalfunctionsofliverandtheprincipalLiverFunctionTests			
iii.Describe briefly the Thyroid function tests			
PRACTICALS 1. Lab safety			
2. Glass ware			
3. Centrifuge			
4. Sample Collection			
5. Urine Analysis – Normal constituents			
6. Blood Chemistry- Glucose Estimation, Estimation of Urea, Creatinine			
7. Demonstration – Lipid profile, Electrolytes			
8. Demonstration – Liver Function Tests			
9. Demonstration – Thyroid Function Tests			
10. Case based clinical biochemistry and interpretation of reports			
11. Spotters			

Course Outcomes:

At the end of this course student should be able

- 1. To know the properties, classification and metabolism of carbohydrates
- 2. To know the properties, classification and metabolism of proteins
- 3. To know the properties, classification and metabolism of lipids
- 4. To know the properties, classification and metabolism of nucleic acids
- 5. To know the properties, classification and metabolism of enzymes and vitamins

References:

- 1. Concise textbook of Biochemistry DM Vasudevan 2nd edition
- 2. Essentials of Biochemistry U Satyanarayana, U Chakrapani 2nd edition
- 3. Essentials of Biochemistry and ocular biochemistry S Ramakrishnan

PSGY1001: PHYSIOLOGY

Semester-I

(with effect from 2022-23 admitted batch)

Introduction

Physiology is the study of functions and mechanisms in a living system. physiology focuses on individual organs, cells, and biomolecules carrying out the chemical and physical functions in a living system. The physiological state is the condition of normal function, while the pathological state refers to abnormal conditions, including human diseases.

Course Objective

• Understand the basic physiological functions of different organs and parts of the human body and important applied aspects

SYLLABUS:

1 - Cell physiology

- 1. Describe the structure and functions of cell
- 2. Describe the functions of the cell organelles
- 3. Describe briefly the types of transport across cell membrane and carrier systems

2 - **Blood**

- 1. Describe the normal composition of human blood and its functions
- 2. Describe the normal plasma proteins & their functions
- 3. Describe the structure and functions of RBC and hemoglobin
- 4. Describe the process of Erythropoiesis
- 5. Describe the Structure, production, & functions of WBCs
- 6. Describe the structure, production & functions of Platelets
- 7. Describe the Types of blood groups and their importance,
- 8. Describe the Mechanism of coagulation

Immunity

- 9. Define immunity and describe the types of immunity
- 10. Classify antigen & antibodies
- 11. Describe T cell immunity & B cell immunity

3 - Digestive system

- 1. Describe briefly the Physiological anatomy of G.I.T and its functions.
- 2. Describe briefly the composition and functions of Saliva
- 3. Describe briefly the physiological anatomy of the stomach and the composition, functions of gastric juice.
- 4. Describe briefly the functions of pancreas, and the composition & functions of pancreatic juice.
- 5. Describe briefly the functions of liver and gall bladder and the Composition, and functions of bile juice.

4 - Respiratory system

- 1. Describe the physiological structure and functions of Respiratory tract.
- 2. Describe the Mechanics of respiration and its regulation
- 3. Describe the Fundamentals of oxygen and CO2 transport in blood
- 4. Describe the lung volumes, spirometry & their importance

5 - Cardiovascular system

- 1. Describe the gross structure of heart and the normal circulation of blood
- 2. Describe the cardiac cycle
- 3. Describe the normal arterial pulse wave and the normal heart rate, and factors increasing and decreasing it.
- 4. Describe normal Blood pressure and its regulation,
- 5. Describe the normal Heart sounds
- 6. Describe the normal ECG and its importance

6 - Muscle & nerve & neurology

- 1. Describe the physiological structure of muscle tissue and its types
- 2. Describe the parts of neuron and their functions, and the synapse and its function
- 3. Describe the action potential, its basis, refractory period, latent period, etc. and neuromuscular transmission
- 4. Describe briefly the autonomic nervous system and the functions and effects of the sympathetic and parasympathetic nervous systems
- 5. Describe the physiological anatomy of the brain and functions of different lobes
- 6. Describe briefly the structure and functions of spinal cord
- 7. Describe briefly the subdivisions of brain stem and their functions
- 8. Describe briefly the special senses and their pathways vision, audition (location & taste)
- 9. Describe the normal EEG,
- 10. Describe briefly the CSF formation, circulation, properties, composition and functions

Course Outcomes:

- 1. Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system.
- 2. Explain Haemopoetic and lymphatic system homeostatic and its altered physiology
- 3. Explain the anatomy and Physiology of the cardiovascular and respiratory system and its disorders
- 4. Explain the anatomy and Physiology of digestive, nervous, urinary, and reproductive systems and their disorders
- 5. Describe the Physiology of muscle contraction and its disorders

References:

- 1. Text book of physiology for BDS AK Jain 6th edition
- 2. Text book of physiology for BDS Sembulingam 3rd edition
- 3. Physiology in nutshell by AK Jain 5th edition
- 4. Manual of practical physiology for BDS AK Jain 4th edition
- 5. Handbook of human physiology Vidyaratan 7th edition

LANG1141: ENGLISH Semester-I

(with effect from 2022-23 admitted batch)

Introduction:

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ Speaking / Reading/ Writing) skills It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives.

COURSE OBJECTIVES

- 1. Understand and communicate in simple English, written and verbal
- 2. Understand and practise the basic principles of English grammar
- 3. Comprehend and summarise a given English essay/paragraph
- 4. Understand common English terms used in the medical/ health care field

Syllabus

- 1. Basic English Grammar 2hrs
- 2. Grammar 8 parts of speech. Structure of sentence. Sentence writing.

 Paragraph writing. 8 hrs Summarizing / precis writing. Reading & comprehension (a small paragraph followed by questions)
- 3. General English Vocabulary & Use of dictionary 2hrs
- 4. Common Medical Terminology 2hrs
- 5. Spoken & Written English 2hrs
- 6. Listening & Reading skills 2hrs
- 7. English comprehension & summarizing & inference 2hrs
- 8. Writing skills Questions based on prescribed prose/ poetry, letter, Summary, Case history, Medical Report, Documentation, Note taking 8rs
- 9. Verbal communication discussion & summarizing. Taking minutes of meeting Writing the minutes. 2hrs

Prescribed Prose -

1. Leo Tolstoy How much land does a man need?

2. O' Henry The Last Leaf

3. Frank Stockton The Lady or the Tiger

Prescribed Poetry -

- 1. William Shakespeare The Seven Ages of Man
- 2. Robert Frost The Road not Taken
- 3. John Milton On his Blindness

COURSE OUTCOMES

By the end of the course, the learners will be able to:

Think critically, analytically, creatively and communicate confidently in English in social and professional contexts with improved skills of fluency and accuracy.
Write grammatically correct sentences employing appropriate vocabulary suitable to different contexts
Comprehend and analyze different academic texts.
Make notes effectively and handle academic writing tasks such as Paragraph writing and Essay writing.
Effectively handle formal correspondence like e-mail drafting and letter writing.

Reference Books:

- 1. Arosteguy, K.O. and Bright, A. and Rinard, B.J. and Poe, M. A Student's Guide to Academic and Professional Writing in Education, UK, Teachers College Press, 2019
- 2. Raymond Murphy, English Grammar in Use A Self-Study Reference and Practice Book for Intermediate Learners of English: Cambridge University Press;2019
- 3. Peter Watkins, Teaching and Developing Reading Skills: UK, CUP, 2018
- 4. DeepthaAchar et al. Basic of Academic Writing. (1and 2) parts New Delhi: Orient BlackSwan. (2012& 2013).
- 5. Kumar S and Lata P, Communication Skills: New Delhi Oxford University Press, 2015

CSCI1301: BASICS OF COMPUTERS

Semester-I

(with effect from 2022-23 admitted batch)

Introduction:

Computer science spans theoretical disciplines (such as algorithms, theory of computation, and information theory) to practical disciplines (including the design and implementation of hardware and software). It deals with concepts regarding the architecture of a computer, common application software and uses of computers in everyday life.

Course Objectives:

- 1. To build necessary concepts regarding the architecture of a computer
- 2. To develop an understanding of the common application software.
- 3. To understand the uses of computers in everyday life.

SYLLABUS:

Theory -

- 1. Describe and identify the principal components of a computer
- 2. Define the various terms used in computer hardware/software / operating system
- 3. Describe the functions and uses of computers including in health care
- 4. Mention the common types of files including Word documents, Spreadsheets (Excel) and Presentations (PowerPoint) and their uses
- 5. Basic Network connecting
- 6. Explain the uses of the internet and email
- 7. Collaborative work using Google suite of applications / Microsoft Office 365 Practical / Demonstration –
- 8. Demonstrate use of a computer for common purposes
- 9. Demonstrate methods for Data storage & retrieval and making folders;
- 10. Perform functions like date/time setting or changing, change display settings, Installing /removing programs etc.
- 11. Understand and Use MS Word / Word Document program
- 12. Prepare a properly formatted, spell-checked document in Word Document including insertion of images and tables and take a print-out/mail as an attachment, and convert to pdf (portable document format)
- 13. Understand and Use MS Excel / Data spreadsheet
- 14. Prepare a proper Excel document (spreadsheet) with given data and sort out data, insert / delete cells, etc., use formula bar for common functions like calculate mean etc, convert to pictorial format like bar / pie diagram, etc.
- 15. Prepare and use computer-based presentations like PowerPoint with appropriate fonts and colours including insertion of images, videos etc.
- 16. Prepare an appropriate file like excel to enter patient data and retrieve it
- 17. Use the facility of Mail Merge between Excel to a Word document
- 18. Sending customized email to selected members
- 19. Prepare a patient report and take a print out
- 20. Prepare a database of patient info and lab results for storage and later retrieval

- 21. Communicate by e-mail including opening email account
- 22. Demonstrate use of search engines / google search etc. for academic information

Learning Outcomes:

At the end of the training program, the student would be able to

- 1. Classify various components of the computer.
- 2. Experiment with the various application software of Microsoft Office suite.
- 3. Make use of collaborative applications over the internet.

Course Outcomes:

At the end of the course student is expected to

- 1. Know about the concept and architecture of a computer
- 2. To understand the common application software.
- 3. To understand and apply the uses of computers in everyday life.

References -

- 1. Introduction to Computers by Peter Norton (McGraw Hill Education)
- 2. Mastering Excel: A Problem-Solving Approach by James Gips (John Wiley and Sons)
- 3. SAMs Teach Yourself Computer Basics in 24 hours

ENVS1051: ENVIRONMENTAL SCIENCE

Semester-I

(with effective from 2022-23 admitted batch)

Introduction:

The course enables the students to adapt eco-centric thinking and actions rather than human-centric thinking on natural resources, their utilization and conservation. The course also focuses on the importance of ecosystems, biodiversity and their degradation led to pollution. This course helps in finding solutions through application of control measures to combat pollution and legal measures to achieve sustainable development.

Course Objectives:

- 1. To impart knowledge on environment and ecology.
- 2. To familiarize learners about different types of pollution and its measures to control.
- 3. To introduce learners about natural resources.

Syllabus

UNIT-I

INTRODUCTION TO ENVIRONMENT AND ECOLOGY

06

Hours

Definition of environment, ecology and ecosystem. Components of environment. Natural and man-made changes on environment and disasters.

UNIT-II POLLUTION AND ITS ABETMENT

10

Hours

Air pollution-primary air pollutants, origin, control measures, air quality norms. Land pollution, types of land pollution-their sources, control measures. Solid waste disposal measures. Water resources. Types of water pollution, control measures. Water quality standards. Noise pollution, control measures, acceptable noise levels. Radiation-types, sources of radiation, biological effects of radiation.

UNIT-III NATURAL RESOURCES

04 Hours

Conventional and non-conventional energy resources, energy conservation. Role and uses of forests, effects of deforestation. Wildlife conservation. Forest conservation Act.

COURSE OUTCOMES

After the completion of this course student will be able to

- List components of environment
- Recall natural and man-made environment disaster
- Demonstrate air pollution control measures

- Summarize solid waste disposal measures
- Explain radiation and its biological effects
- Identify conventional and non-conventional energy resources

REFERENCES:

- 1. ErachBharucha. Textbook of environmental studies for undergraduates Courses-Universities Press, India Private Limited. 2019.
- 2. Kaushik A and Kaushik C.P. Perspectives in Environmental Studies. New Age International Publishers Edition-VI. 2018.
- 3. McKinney M.L., Schoch R.M., Yonavjak L. Mincy G. Environmental Science: Systems and Solutions. Jones and Bartlett Publishers. 6th Edition. 2017.
- 4. Botkin D.B. Environmental Science: Earth as a Living Planet. John Wiley and Sons. 5th edition. 2005.
- 5. Benny Joseph. Textbook of Environmental Studies 3rd edition, McGraw Hill Publishing company limited. 2017.

PSYC1031: PSYCHOLOGY

Semester-I (with effect from 2022-23admitted batch)

Introduction:

Health in its broadest sense includes physical and mental health. Health workers in recent years have become interested in dealing with mental health problems in general health centres. Mental illnesses have been shown to be common, occurring in all societies and in all sections of the population, causing immense suffering and disability.

Course Objective

The objectives of this course is:

• To enable the student to enlist common mental health issues encountered in general health care settings.

SYLLABUS:

Unit I

Behaviors that Cause Concern – Violent Behaviour and Aggression; Confusion and Agitation; Suicide; Seizures; Disturbances Among the Elderly.

Unit II

Symptoms that are Medically Unexplained – Multiple Physical Complaints; Fear and Panic; Sleep Problems; Fatigue; Loss of a Body Function.

Unit III

Problems Arising from Loss and Violence – Trauma; Intimate Partner Abuse; Sexual Assault; Bereavement.

Unit IV

Problems in Childhood and Adolescence – Learning Disturbances; ADHD; Child Abuse; Misbehavior; Enuresis; Depression in Adolescents.

Unit V

Mental Health in Other Contexts – Reproductive Health; Health of Prisoners; Refugees; Disasters; Caring for Carers.

Learning Outcomes

The course enables the student to:

- ✓ Identify psychological distress states in the general health setting.
 - ✓ Distinguish between psychotic and non-psychotic disorders.

Course Outcomes:

The course enables the student to:

- Identify abnormal mental health conditions in the general health setting that require health professionals' attention.
- To understand the symptoms that distinguish between psychotic and non-psychotic disorders.
- Be able to apply their knowledge and provide help to persons under distress due to calamities caused by man and nature
- To analyse different abnormal conditions in children during developmental stages
- To evaluate abnormal behaviors observed in persons experiencing unusual contexts

References

- 1. Goldberg, D.P. (1992). Common Mental Disorders: A Bio-Social Model. London: Routledge.
- 2. Helzer, J.E. &Hudziak, J.J. (2002). Defining Psychopathology in the 23st Century: DSM V and Beyond. Washington DC: American Psychiatric Publishing Inc.
- 3. Pilgrim, D. (2014). Key Concepts in Mental Health. London: Sage.
- 4. Patel, V. (2003). Where there is No Psychiatrist. A Mental Health Care Manual. Glasgow: Gaskell.
- 5. International Journal of Mental Health
- 6. Community Mental Health Journal

SEMESTER-II

S.No	Course Code	Course Title	Course Category
1	ANAT1011	ANATOMY - II	С
2	PSGY1011	PHYSIOLOGY - II	С
3	BTSC1041	BIOTECHNOLOGY & MEDICAL PHYSICS (Only Internal exam, no university exam)	FC

ANAT1011: ANATOMY - II

(with effect from 2022-23)

INTRODUCTION:

Anatomy deals with the structural organization of human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture into the clinical domain. The department of anatomy is committed to provide quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides and VARIOUS models provide the ideal environment to learn anatomy during the 1st year of their course.

COURSE OBJECTIVES:

☐ The objective of this subject is to provide an outline of anatomy to improve the students understanding the technical and diagnostic procedures used, with special emphasis on limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology

Syllabus:

LEARNING OUTCOMES:

After completion of the1st year course -at the end of second semester, the student must be able to know the following:

a. Neurology

- 1. Mention any four cranial nerves
- 2. Surfaces & Lobes of cerebrum
- 3. Parts of Hind brain
- 4. Cranial nerves
- 5. Parts of brain stem and cranial nerves attached to it
- 6. 6.Coverings of Brain
- 7. Broca's area
- 8. White fibres of cerebrum

b. Gastro Intestinal Tract

- 1. Describe briefly the location, surfaces, lobes, relations, and blood supply of Liver?
- 2. Porta hepatis
- 3.Parts &Blood supply of stomach
- 4, Differences between Small& Large Intestines
- 5.Ligaments of Liver
- 6.Appendicitis

c. Excretory & Reproductive systems

- 1. Name the components of female reproductive system and Describe uterus and its supports.
- 2.Internal structure of kidney
- 3. Visceral Relations of kidney
- 4.Nephron
- 5. Coverings of Testis
- 6.Parts of Fallopian tube
- 7.Layers of scrotum
- 8. Spermatic cord
- 9.Male urethra &its parts

d. Endocrine system & others

- 1. Name the Endocrine glands and Explain the morphology and blood supply of Thyroid gland.
- 2. Adenohypophysis
- 3.Dwarfism
- 4. Adrenal medulla
- 5.Diabetes mellitus
- 6. Blood supply of Thyroid gland
- 7. Islets of langerhans
- 8.Goiter
- 9. Endocrine part of Pancreas

COURSE OUTCOMES:

- This course is aimed to make the student to gain knowledge in basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology which provides foundation in completion of the course.
- Enable to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Liver.
- Enables to understand about the Endocrine glands and explain the morphology and blood supply of Thyroid gland.

References:

- 1. Anatomy and physiology –Vijaya D Joshi, Ashalatha N Nandedkar, Sadhana S Mendhurwar
- 2. Anatomy and physiology- InduKhurana and ArushiKhurana
- 3. Human anatomy &physiology for nursing -Mahindra Kumar Anand&MeenaVerma
- 4. Understanding human anatomy & physiology- William Davis(McGrawHill)

PSGY1011: PHYSIOLOGY-II

SEMESTER-II

(With effect from 2022-23 admitted batch)

Introduction

Physiology is the study of functions and mechanisms in a living system. physiology focuses on individual organs, cells, and biomolecules carry out the chemical and physical functions in a living system. Physiological *state* is the condition of normal function and this course helps in understanding the functions of endocrine system, renal physiology and reproductive physiology.

Course Objectives:

- To know about functions and physiological anatomy of endocrine system Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
- To impart knowledge related to physiological structure of kidney and the nephron and its functions.
- To understand about reproductive system, process and methods of determination of ovulation.
- To know about types of joints, the structure and formation of cartilage and the structure and formation of bone.

SYLLABUS

1 - Endocrine system

- 1. Describe the physiological anatomy of Thyroid gland, functions and its applied physiology
- 2. Describe the physiological anatomy of Adrenal gland, functions and its applied physiology
- 3. Describe the physiological anatomy of Parathyroid gland, functions and its applied physiology
- 4. Describe the physiological anatomy of Pancreas, its functions and its applied physiology
- 5. Describe the physiological anatomy of hypothalamus and the Pituitary gland, their functions and its applied physiology

2 - Excretory system

- 1. Describe the physiological structure of kidney and the nephron and its functions
- 2. Describe the GFR and factors affecting GFR
- 3. Describe the Substances absorbed and secreted from renal tubules
- 4. Describe the various Renal function tests
- 5. Describe briefly the Urinary bladder and its functions and the physiology of micturition Skin
- 6. Describe the Structure and functions of skin

3 - Reproductive system

- 1. Describe the Physiology of Puberty
- 2. Describe the process of menstruation, normal menstrual cycle, menarche and

- menopause.
- 3. Describe briefly the process of Ovulation and methods of determination of ovulation
- 4. Describe briefly the normal physiology of pregnancy and mention the diagnostic tests for pregnancy and their physiological basis
- 5. Describe briefly the functions of placenta and pregnancy diagnostic tests
- 6. List out the Contraceptive methods in male and female
- 7. Describe the Spermatogenesis

4 - Bone & Joints

1. Describe the types of joints, the structure and formation of cartilage and the structure and formation of bone.

PRACTICALS

HAEMATOLOGY

- 1. Estimate Hemoglobin in given blood sample
- 2. Estimate bleeding time & clotting time
- 3. Measure ESR of given blood sample
- 4. Perform RBC count of given blood sample
- 5. Perform WBC count of given blood sample
- 6. Perform a differential WBC count of the given sample
- 7. Calculation of blood indices
- 8. Determine blood group of a given sample

CARDIOVASCULAR SYSTEM

- 1. Measure pulse rate, heart rate
- 2. Measure BP
- 3. Measure weight and height and calculate Body Mass Index
- 4. Demonstrate examination of heart inspec JVP, localize apex beat, look for any abnormal pulsations, percuss cardiac dullness, auscultate heart for normal sounds
- 5. Record an ECG

RESPIRATORY SYSTEM

- 1. Measure respiratory rate & temperature
- 2. Demonstrate examination of respiratory system inspect the chest for symmetry, movements, localize apical impulse and trachea, measure chest expansion, percuss the chest for lung resonance, liver dullness, auscultate lungs for breath sounds
- 3. Perform spirometry in a given individual and interpret the values

CENTRAL NERVOUS SYSTEM

- 1. Demonstrate examination of the cranial nerves
- 2. Demonstrate examination of the motor system bulk, tone, power of different groups of muscles, coordination, gait
- 3. Assist in the recording of an EEG
- 4. Demonstrate the various sensory and motor reflexes abdominal, plantar, biceps, triceps, supinator, knee, ankle
- 5. Demonstrate examination of sensory system fine touch, pain, vibratio

Course Outcomes:

- At the end of this course the student will be able to To understand the physio log anatomy Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas and their applied aspects.
- To understand physiological structure and functioning of kidney and the nephron.
- To understand about the physiology of reproductive system and applied aspects
- To know about the types of joints, the structure and formation of cartilage and the structure and formation of bone.

References:

- 1. Text book of physiology for BDS AK Jain 6th edition
- 2. Text book of physiology for BDS Sembulingam 3rd edition
- 3. Physiology in nutshell by AK Jain 5th edition
- 4. Manual of practical physiology for BDS AK Jain 4th edition
- 5. Handbook of human physiology Vidyaratan 7th edition

BTSC1041: BIOTECHNOLOGY &MEDICAL PHYSICS SEMESTER-II

(with effect from 2022-23 admitted batch)

Introduction:

The human body generates a variety of voltages which are usually very small. When basics of physics and technology get applied to the living things, we name it as Biotechnology which helps the medical personnel or physicians to make a better diagnose of the problem in a patient and provide the appropriate treatment. Biomedical engineering is the application of knowledge and technologies to solve the problem of the living system.

Course Objectives:

- The course is aimed to make the student to understand the principles of medical physics and biotechnology as applicable to health care and practice them in their respective speciality.
- Know about how to use various electronic instruments to record and interpret the overall wellbeing of the human system.
- Understand about the various sensors and transducers used to acquire and record the Bioactivity of a human beings.

Syllabus:

Units & Measurement (1-2hrs)

- 1. Define speed velocity, Work, Energy, Power & their units
- 2. Define the law of Conservation of energy
- 3. Describe briefly the Energy changes in human system

Heat (1-2hrs)

- 4. Define Energy& temperature
- 5. List out methods for Measurement of temperature & scales & instruments
- 6. Describe briefly Use of heat & cold in medicine—incl. heat therapy/ cryosurgery etc.

Bioelectric potentials (3)

- 7. Describe briefly about Electric potentials innerve & neuron
- 8. Describe briefly about Electric potentials in heart, Brain, Muscle

Electricity & Magnetism in Medicine (2)

9. Describe briefly Basic Principles of electricity, units, measurement, voltage/currentetc.

- 10. Describe briefly the Basic principles of magnetism
- 11. List out the Applications of electricity in medicine—incl. electric shock in cardiology,psychiatry etc.
- 12. DescribebrieflytheroleofLowfrequencyelectricity&magnetisminmedicine
- 13. List out import ant Electrical hazards—types, effects, physiological effects Electromagnetic radiation—properties, interference (1) Sound & Ultrasound (2-3)
- 14. Describe briefly the General properties of sound & ultrasound
- 15. Describe the role and uses of Ultra sound in medicine
- 16. Describe briefly Doppler effect Light (2)
- 17. Describe briefly the Basic properties of light
- 18. Describe briefly the important properties & Applications of visible light/infrared /ultraviolet/ lasers in medicine Physical principles underlying Blood flow—(1hr)
- 19. Describe briefly about laminar flow & turbulent flow
- 20. Describe briefly the Bernoulli principle

Electronics in biomedical applications (4-5)

- 21. Describe briefly about Insulators &conductors, Transformers, Motors,
- 22. Describe briefly about Batteries, Electric power generation, power supply/UPS/voltage stabilizers
- 23. Describe briefly about Power supply circuits—transformer/rectifier/filter/regulator
- 24. Describe briefly about Materials–Resistive/Dielectric/Magnetic/Piezoelectricmaterials & their uses Components–(5-6)
- 25. Describe briefly about resistors/capacitors/inductors
- 26. Describe briefly about Semi-conductors-diodes/transistors/film circuits/integrated circuits
- 27. Describe briefly about Amplifiers–voltage amplifiers/power amplifiers/feedback in amplifiers/operational amplifiers/
- 28. Describe briefly about Input impedance, output impedance, gain, noise
- 29. Explain about Distortion, differential amplification
- 30. Describe briefly about Oscillators and Filters and Modulators–DemodulatorsComponents–(6-7)

- 31. Describe briefly about Display devices-lamps/LED/oscilloscope
- 32. Describe briefly about recording devices
- 33. Describe briefly about Process controllers
- 34. Describe briefly about Digital electronics
- 35. List out the Bioactivity monitoring instruments
- 36. Describe briefly about Transducers–pressure, temperature, velocity, flow, vibration
- 37. List out the Electrodes-different types & application
- 38. Describe briefly about Amplifiers & application in medicine
- 39. Describe briefly about the Principles of averaging & signal analysis
- 40. List out the common methods of Trouble shooting & analysis of medical instrumentation

Course Outcomes:

After completing this course, the student should be able to

- Get acquainted with the principles involved in using various electronic instruments to record and interpret the overall wellbeing of the human system.
- Know about Electric potentials and their origination
- Understand the applications of electricity in medicine
- Explain about the various sensors and transducers used to acquire and record the Bioactivity of a human being
- Know the common methods of Trouble shooting & analysis of medical instrumentation.

References:

- 1. Leslie Cromwell, Biomedical Instrumentation and Measurement, Prentice hall of India, New Delhi, 2007.
- 2. Joseph J.carr and John M. Brown, Introduction to Biomedical Equipment Technology, John Wileyand sons, New York, 4th Edition, 2012
- 3. Khandpur R.S, Handbook of Biomedical Instrumentation, , Tata McGraw-Hill, New Delhi, 2nd Edition, 2003.
- 4. D. Patranabis, Principles of Industrial Instrumentation', Tata McGraw-Hill Publishing, 1976.
- 5. D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education (India) Private Limited, 2014.
- 6. John G. Webster, Medical Instrumentation Application and Design, John Wiley andsons, NewYork, 1998.
- 7. M.Arumugam, 'Bio-Medical Instrumentation', Anuradha Agencies, 2003.
- 8. Robert Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory" PHI; 8th Edition.2001.

SEMESTER-III

S. No	Course Code	Course Title	Course Category
1	PHCG2001	PHARMACOLOGY - I	С
2	MIBG2001	MICROBIOLOGY - I	С
3	PATH2001	PATHOLOGY - I	С
4	CMED2001	COMMUNITY MEDICINE & (SOFT SKILLS)	С
5	NURS2001	BASICS OF PATIENT CARE (No Uni. Exam)	FC
6	OPTH2001	OPTOMETRY - I	С

PHCG2001 - PHARMACOLOGY:

SEMESTER-III

(with effect from 2022-23 admitted batch)

Introduction:

Basic drug effect, classification of drugs acting on nerves, heart, blood pressure, respiratory system, gastrointestinal system, kidneys, hormones, musculoskeletal system and analgesics etc., Common drugs- effects and side effects and drug interactions.

COURSE OBJECTIVES:

• This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

SYLLABUS

Theory

S.No	System	Topic	No. of hours
		Introduction	
		Pharmacokinetics	1
1.	General	Pharmaco	2
	Pharmacology	dynamics	2
		Pharmaco	1
		vigilance	
	Autonomic Nervous	Parasympathetic	
2.	System & Skeletal	drugs	5
	Muscle Relaxants	Sympathetic	
	Widsele Relaxants	drugs	
		Prostaglandins,	1
3.	Autacoids	Histamines,	1
		antihistamines	1
		RAAS	1
		Drugs used in	
		Angina	
		Anti-	_
4.	Cardiovascular	hypertensives	5
	System & Blood	Anticoagulants	
		Thrombolytics	
		Antiplatelets	
		Hematinics	
5.	Renal System	Diuretics	2
	Total F	Iours	20

Practical

S.No	Торіс	No. of hours
1.	Spotters – Sources of drugs, Dosage forms, drug administration devices, photographs of scientists, adverse drug reactions	3
2.	Case based discussion of Pharmacotherapy or Side effects	7
	Total Hours	10

COURSE OUTCOMES:

At the end of course, students should know about

- 1. Pharmacokinetics and pharmaco dynamic principles of drugs
- 2. Drugs acting on autonomic nervous system
- 3. Drugs modulating autacoids
- 4. Drugs used in cardiovascular and hemodynamic disorders.
- 5. Drugs acting on renal system

- 1. Essence of Pharmacology by K.D. Tripathi
- 2. Pharmacology and Pharmacotherapeutics by Satoskar
- 3. Text book of Pharmacology for Allied Sciences Padmaja Udaykumar

MIBG2001 – MICROBIOLOGY SEMESTER-III

(with effect from 2022-23 admitted batch)

Introduction:

The goal of teaching Microbiology is to provide understanding of the natural history of infection and diseases in order to deal with the Etiology, pathogenesis, Pathogenecity, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

- 1. Plan and interpret Laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
- 2. Perform simple laboratory test which help to arrive at rapid diagnosis.
- 3. Understand methods of disinfection and sterilization and their application to control and prevention of hospital acquired infections.

SYLLABUS:

Theory - 25hrs & Practical 15 hrs

S.No	Торі	Hour
	c	S
1.	Introduction of brief history of Microbiology	1
2.	Historical Aspect Relationship of Micro-organism to men	1
3.	Micro-organism in Disease and Health Requirement	1
4.	Uses of common Laboratory equipment Incubator, Hot Air Oven, Water Bath Anaerobic Jar, Centrifuge, Autoclave Microscope	2
5.	Glassware: Description of Glassware, its use, handling and care	1
6.	Sterilization: Definition Classification and General Principal of Sterilization Autoclave – its structure, functioning, control and indicator Definition Types Mode of Action Uses	2
7.	Collection, Transportation and processing of clinical samples for Microbiological Investigations	1
8.	Antibiotic susceptibility testing	1
9.	Universal precautions	1
10.	Bacteriology: Definition Bacteria – General characteristics of Bacteria Classification	1
11.	Morphology of Bacteria Structure of Cell, Capsule, Flagella, and Spore Growth	2
12.	Physiology of bacteria	1
13.	Staphylococci and Streptococcal infections	2
14.	Meningococci and Gonococci	2
15.	Gram negative bacterial infections	1
16.	Tetanus and gas gangrene	2
17.	Tuberculosis	1
18.	Leprosy	1
19.	H. influenza	1
	Total hours	25

S.No	Practical	Hours
1.	Microscopy	1
2.	Care of glassware and sterilization practices	2
3.	Media pouring	1
4.	Slide preparation	1
5.	Smear preparation	1
6.	Hanging drop	1
7.	Simple staining	2
8.	Gram stain	2
9.	Acid fast stain	2
10.	Disinfection	2
11.	Total hours	15

COURSE OUTCOMES:

- Knowledge about the association of Micro-organisms in Disease and HealthRequirement and the common pathogens of Medical importance
- Know about the commonly used Microbiology Laboratory equipment and thecleaning of glassware
- Know about Collection, Transportation and processing of clinical samples for Microbiological Investigations
- Knowledge about Sterilization and Disinfection practices
- Development of skills of Media pouring
- Slide and Smear preparation
- Performing Staining techniques in Microbiology (Simple staining, Gram's staining, AFB staining)

- 1. Ananthanarayan and Paniker's Textbook of Microbiology 10th edition
- 2. Textbook of Microbiology C P Baveja

PATH2001 – PATHOLOGY: SEMESTER-III

(with effect from 2022-23 admitted batch)

Introduction:

The goal of teaching Pathology is to provide comprehensive knowledge of the causes and mechanisms of the duties in order to enable to achieve complete understanding of the natural history and clinical manifestation of the diseases.

COURSE OBJECTIVES:

- 1. To describe the rationale and principles of technical procedures of diagnostic laboratory tests.
- 2. To know about basic diagnostic tests and correlate with clinical and morphological features of diseases.
- 3. To learn about commonly used bedside tests on blood, urine and other relevant samples.

SYLLABUS:

Unit -I

- Cell injury and death
- Shock

Unit – II

• Inflammation – Acute and chronic inflammation

Unit – III

• Neoplasia

Unit - IV

• Malignancies – Thyroid, breast, stomach, kidney, prostate, ovary, cervix, endometrium, lung, bone, and soft tissue, skin.

Unit – V

He	ematology –
	Anemia – Iron deficiency anemia, Megaloblastic anemia, Aplastic anemia
	Polycythemia
	Leukemia

COURSE OUTCOMES:

1. At the end, the students shall be able to describe the rationale and principles of technical procedures of diagnostic laboratory tests.

- Interpret diagnostic laboratory test and correlate with clinical and 2. morphological features of diseases.
- 3. Perform simple bedside tests on blood, urine and other biological fluid samples.

- Pathologic basis of disease Robbins & amp; Cotran 10^{th} edition Pathology Harshmohan 8^{th} edition 1.
- 2.
- Textbook of Pathology for Allied Health Sciences Ramdas Nayak 3.
- Textbook on Pathology for DMLT and Paramedical courses Dr. I.Clemen 4.
- Essentials of Clinical Pathology Shirish. M. Kawthalkar 2nd edition 5.

CMED2001 – COMMUNITY MEDICINE: SEMESTER-III

(with effect from 2022-23 admitted batch)

Introduction:

The art and science of application of technical knowledge and skills to the delivery of health care to given community, designed in collaboration with related professionals as well as human and social science on one hand and the community on the other hand. Preventive medicine is science and art of preventing disease, prolonging life and promoting physical and mental health and efficacy.

COURSE OBJECTIVES:

- To orient the students with national health programmes
- To learn categories and coding of hospital waste and their disposal methods.
- To know various occupational health hazards and prevention and control of them.
- To make the students aware of tabulation of data, measuring mean and SD

SYLLABUS: (Total 100 marks- (60 theory and 40 practical)

Concepts of disease:

- 1. Describe natural history of disease with diagram
- 2. Determinants and dimensions of health
- 3. Multifactorial causation of disease
- 4. Epidemiological triad
- 5. Explain concepts of prevention and modes of intervention with examples
- 6. Risk factors and risk groups
- 7. Ice berg phenomena of disease
- 8. Screening of diseases.

General epidemiology

- 1. Describe various tools of measurement in epidemiology (rate, ratio, proportion) and measures of morbidity (incidence, prevalence etc).
- 2. Classification of epidemiological methods and explain briefly each method

<u>Nutrition</u>

- 1. Classify foods and nutrients and describe concept of balanced diet
- 2. Describe the common vitamin deficiency disorders and their preventive measures.
- 3. Outline the common nutritional problems in India and their prevention –Protein Energy Malnutrition, Anaemia
- 4. Describe role of nutritional factors in hypertension, diabetes, cardiovascular disorders and cancer
- 5. Food sanitation, food fortification, food adulteration
- 6. Nutritional assessment.

Occupational Health:

- 1. List out the important occupational hazards and preventive measures
- 2. Enumerate benefits under ESI act

 $\underline{\text{Environment and health:}} \label{eq:water borne diseases, methods of water purification at household level,} \\ \text{Collection of water samples, transport and bacteriological analysis.}$

Soft Skills, Health Education& communication - Methods with examples., Principles

Practical:

- 1. Nutrition spotters
- 2. Growth chart
- 3. Occupational health spotters
- 4. Bio-statistics: Types of data, Descriptive statistics,
- 5. Sensitivity, specificity, Positive predictive value, Negative predictive value of a diagnostic test

COURSE OUTCOMES:

 This course is aimed to make the student to understand national health programs, hospital waste management, occupational health hazards prevention and control of occupational diseases and calculation of measures of central tendency and diagrammatic representation of data.

- 1. Park's Textbook of Preventive and Social Medicine 26th edition
- 2. Statistics and Research: Mahajan

NURS2001 – BASICS OF PATIENT CARE:

SEMETER-III

(with effect from 2022-23 admitted batch)

Introduction:

This course develops knowledge and skills basic to patient care undergoing radiographic procedures. Topics include patient communication, patient assessment, and safety of patient and healthcare provider in the health care facility. Focus extends to include proper body mechanics and patient positioning to promote comforting for patient. Basics of infection control and methods of medical asepsis were focused on especially when dealing with patients undergoing certain invasive procedures. Finally describe and perform basic procedures like injections, Ryle's tube, Foley's catheterization, taking blood samples, wound dressing etc.

COURSE OBJECTIVES:

- 1. Students will gain understanding of the fundamental concepts of patients care while in the hospital or undergoing a special procedure.
- 2. Students will become familiar with some procedures relevant to patient condition
- 3. Students will Be able to provide certain basic procedures and identify symptoms of altered cognition.
- 4. Students will be able to relate them to patient overall health and wellbeing.
- 5. Relationship between certain procedures, radiographic procedure, and patient overall health will be emphasized.

SYLLABUS:

LEARNING OUTCOMES:

The main Intended Learning Outcome (ILO) that is measured throughout this course is "Critical Thinking." This ILO is conceptually defined as "a cognitive process that aims at using the rational and logical examination of ideas for the purposes of understanding, problem solving, and decision-making." Critical thinking will facilitate the process of teaching/learning, which is originally a change in thinking or behaviour.

- I- Caring
- II- Communication
- III- Critical thinking
- IV- Therapeutic intervention
- V Leadership
- VI- Employer's satisfaction

Unit No.	Learning objectives	Content
I	Describe the principles of care of bedridden patient	Care of a bedridden patient - Patient assessment - Assessing personal concerns of patient - Assessing physiological needs - Assessing current physical status
II	Describe the basic principles of communication	Communication with patients and attendants - Communication skills - Communication with patients - Special circumstances in communication - Patient education - Communication with patient's families - Dealing with death and loss
III	Describe and demonstrate techniques to maintain patient hygiene	Patient hygiene - Cycle of infection - Body's defence against infection - Infectious diseases - Maintaining hygiene
IV	Describe and practice infection control measures in the ward and ICU	Infection control measures in the ward and ICU - Microorganisms - Cycle of infection - Hand Washing - Preventing disease transmission
V	Describe and record vital data and basic clinical parameters	Vital data and basic clinical parameters -Assessment of body temperature: sites, equipments and techniques, special considerations - Assessment of pulse: Sites, location, equipments and technique, special consideration - Assessment of respirations: technique, special Consideration Recording of vital signs
VI	Describe and demonstrate how to monitor patients	Patients monitoring Assessing personal concerns of patient - Assessing physiological needs - History taking - Physical assessment
VII	Describe the principles of patient safety	Patient safety - Patient transfer - Restraints and immobilization - Accidents and incident reports - Fire hazards - Other common hazards

VIII	Describe and demonstrate the principles of cleaning, disinfection and sterilization in the hospital wards/	Principles of cleaning, disinfection and sterilization in the hospital wards/ ICU - Hand washing: simple, hand antisepsis and surgical antisepsis (scrub) - Isolation: source and protective -Sterile packs - Surgical scrubbing - Gowning and gloving -Sterilization - Fumigation - Autoclaving
IX	Describe the common routes for drug administration	Common routes of drug administration and precautions to be taken -Assess the patient's condition - Recognize different definitions associated with pharmacology - Recognize various classifications of drugs - Identify the ten rights of drug administration - List out common routes and methods of drug administration - Perform venipuncture using appropriate universal Precautions
X	Describe and perform basic procedures	Basic procedures like -Injections, -Ryle's tube, -Foley's catheterization, -Taking blood samples, -Wound dressing,
XI	Describe and demonstrate documentation of patient related data	Documentation of patient related data in the case sheet records -History taking data sheet - Documentation: Purpose of Recording and reporting, Communication within the Health Care Team, - Types of records; ward records, medical/nursing records, Common Record-keeping forms, - Computerized documentation
XII	Describe and demonstrate use of basic hospital equipment	Use of basic hospital equipment

COURSE OUTCOMES:

- 1. Perform basic infection control practices in the Healthcare setting.
- 2. Use effective skills to draw blood and accurately label tubes
- 3. Perform basic procedures using advanced technique and interpretation.
- 4. Perform basic patient care skills.
- 5. Communicate with a diverse patient population using written and oral communication and listening skills in interactions.

- Ehrlich, R., A., McCloskey, E. D., & Daly, J., A. (2004). Patient Care in Radiography with an Introduction to Medical Imaging. Mosby: An Affiliate of Elsevier. Sixth edition.
- 2. Adler, A., M., & Carlton, R., R. (2007). *Introduction to Radiologic Sciences and Patient Care*. Saunders: Elsevier. Fourth edition
- 3. Torres, L.,S. (1989). *Basic Medical Techniques and Patient Care for Radiologic Technologists*. J. B.Lippincott Company: Philadelphia. Third Edition.

OPTH2001 – OPTOMETRY – I:

SEMESTER-III

(with effect from 2022-23 admitted batch)

Introduction:

BSc Optometry is a branch in allied health sciences which deals with the examination, diagnosis and treatment of diseases and disorders of visual system. This is a challenging career with unlimited opportunities. The training will enable a student to become a competent person in providing service as optometrist, refractionist and ophthalmic assistant.

COURSE OBJECTIVES:

By the end of this course should should be able to

- 1. To know diseases and disorders of eye- etiology, pathogenesis
- 2. To understand visual optics and optometric optics
- 3. To learn basic examination and diagnostic tests related to eye

SYLLABUS:

S.No	Course Title
1	Business Communication
2	Occular Microbiology and pathology
3	Visual Optics-I
4	Optometric optics I
5	Clinical examination of the visual system
6	Microbiology & Pathology Lab
7	Lighting and Eye
8	Optometric optics I Lab

COURSE OUTCOMES:

- 1. Able to apply knowledge in diagnosing diseases and disorders of eye
- 2. Communicate with the patient regarding the pathology
- 3. Able to examine and apply learnt optics

- 1. AK Khurana,Indu Khurana Anatomy and Physiology of the eye -2^{nd} edition
- 2. Pathology of the eye and orbit K S Ratnagar
- 3. Clinical optics T E Fannin and T Grosvenor 2nd edition
- 4. M Jalie principles of ophthalmic lenses
- 5. Visual optics and refraction a clinical approach David D Michaels

SEMESTER: IV

S. No	Course Code	Course Title	Course Category
1	PHCG2011	PHARMACOLOGY - II	С
2	MIBG2011	MICROBIOLOGY - II	С
3	PATH2011	PATHOLOGY - II	С
4	CMED2011	COMMUNITY MEDICINE	С
5	OPTH2011	OPTOMETRY - II	С

PHCG2011 - PHARMACOLOGY:

SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

Basic drug effect, classification of drugs acting on nerves, heart, blood pressure, respiratory system, gastrointestinal system, kidneys, hormones, musculoskeletal system and analgesics etc., Common drugs- effects and side effects and drug interactions.

COURSE OBJECTIVES:

• This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

SYLLABUS:

Theory – 20hrs & Practical 10 hrs

Theory

S. No	System	Торіс	No. of hours
1.	Central Nervous System	Sedatives Antiepileptics Drugs used in Parkinsonism General Anaesthetics Local Anaesthetics Opioids NSAIDs	1 1 1 2 1 1
2.	Respiratory System	Drugs used in Bronchial Asthma	1
3.	Gastrointestinal System	Anti Emetics Drugs for peptic ulcer	1 1
4.	Endocrine System	Antidiabetic drugs Antithyroid drugs Drugs acting on Uterus	1 1 1
5.	Chemotherapy	Antibiotics Antiviral drugs	5 1
	Tot	al Hours	20

Practical

S. No	Торіс	No. of hours
1.	Spotters – Sources of drugs, Dosage forms, drug administration devices, photographs of scientists, adverse drug reactions	3
2.	Case based discussion of Pharmacotherapy or Side effects	7
	Total Hours	10

COURSE OUTCOMES:

At the end of course, students should know about

- 1. Drugs acting on central nervous system
- 2. Drugs used in treatment of bronchial asthma
- 3. Drugs used as anti emetics and in peptic ulcer diseases.
- 4. Drugs used in the treatment various endocrine disorders.
- 5. Chemotherapeutic drugs.

REFERENCES:

- 1. Essence of Pharmacology by K.D. Tripathi
- 2. Pharmacology and Pharmacotherapeutics by Satoskar
- 3. Text book of Pharmacology for Allied Sciences Padmaja Udaykumar
- 4. Pharmacology for Nurses Tara V.Shanbhag, 2nd edition

MIBG2011 – MICROBIOLOGY:

SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Microbiology is to provide an understanding of the natural history of infection and diseases in order to deal with the Etiology, pathogenesis, Pathogenicity, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

- 1. Plan and interpret Laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
- 2. Perform simple laboratory test which help to arrive at rapid diagnosis.
- **3.** Understand methods of disinfection and sterilization and their application to control and prevention of hospital acquired infections.

SYLLABUS:

Theory – 25hrs & Practical 15hrs

S.No.	Topic	Hours
1	Immunology: Antigens and antibodies 1	
2	Antigen and antibody reactions	1
3	Hypersensitivity	1
4	Immunohematology	1
5	Autoimmunity	1
6	Virology: Introduction to viruses and lab diagnosis of viral infections	1
7	Common viral infections	1
8	HIV	1
9	Hepatitis viruses	1
10	Dengue virus	1
11	Rabies virus	1
12	Parasitology: Definition General Characteristics of Parasite Classification of Parasite Mode of transmission	2
13	Entamoeba histolytica and protozoan diarrheal pathogens	1
14	Malarial parasites	1
15	Helminths	1

16	Cysticercosis	1
17	Mycology: Common mycological infections and lab diagnosis	1
18	Candida	1
19	Superficial fungal infections	1
20	Systemic mycosis, cryptococcus	1
21	Opportunistic mycoses	1
22	Infection control and prevention	1
23	Good laboratory practices	1
24	Safe infusion practices	1
25	Safety in laboratory	1
	Total Hours	25

S.No	Practical	Hours
1.	Microscopy	1
2.	Specimen collection and Handling	1
3.	Sputum examination	1
4.	Stool examination	2
5.	Slide preparation staining and examination	2
6.	Serology	1
7.	Virology	1
8.	ELISA	1
9.	ICT Tests	1
10.	Gram staining	2
11.	Acid fast staining	2
12.	Total hours	15

COURSE OUTCOMES:

Knowledge about the Basics of Immunology
Know about the Common viral infections and their Specimen collection and Handling
Know about the Common parasitic infections and their Specimen collection and Handling
Know about the Common fungal infections and their Specimen collection and
Handling
Knowledge about Good laboratory practices, Safe infusion practices and Safety
inlaboratory
Knowledge about the commonly performed serological tests in the diagnosis of
variousdiseases
Knowledge about the commonly performed Rapid diagnostic tests in the
diagnosis ofvarious diseases

REFERENCES:

- 1. Ananthanarayan and Paniker's Textbook of Microbiology 10th edition
- 2. Textbook of Microbiology C P Baveja

PATH2011 - PATHOLOGY:

SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Pathology is to provide comprehensive knowledge of the causes and mechanisms of the duties in order to enable to achieve complete understanding of the natural history and clinical manifestation of the diseases.

COURSE OBJECTIVES:

- 1. To describe the rationale and principles of technical procedures of diagnostic laboratory tests.
- 2. To know about diseases of Haematology, GI tract respiratory system, cardiovascular system and endocrinology.

SYLLABUS:

Unit -I

- Hematology Lymphoma
- Kidney Glomerulonephritis, CKD, Tumors

Unit – II

- Thyroid Goitre, Tumors
- Heart Myocardial Infarction, Rheumatic Fever, Hypertension

Unit – III

• Infections – Abscess, TB, HIV/AIDS, Amebiasis, Malaria, Meningitis, UTI

Unit – IV

- Lung Asthma, COPD
- Liver Hepatitis

Unit - V

• GIT – Peptic Ulcer Disease, Gastritis

COURSE OUTCOMES:

- To impart knowledge on various common infectious diseases with its lab diagnosis and Hematological malignancies.
- 2. Make student familiar with predisposing factors, etiopathogenesis, morphology and complications of common diseases of kidney, lung, liver, git, heart and thyroid.
- 3. To demonstrate few special staining techniques and body fluid analysis.

4. To acquire knowledge about handling of tissue specimens, histopathology techniques, automated processors and few specimens and slides in histopathology

- 6. Pathologic basis of disease Robbins & Dotran 10th edition
- 3. Pathology Harshmohan 8th edition
- 4. Textbook of Pathology for Allied Health Sciences Ramdas Nayak
- 5. Textbook on Pathology for DMLT and Paramedical courses Dr. I.Clemen
- 6. Essentials of Clinical Pathology Shirish. M. Kawthalkar 2nd edition

CMED2011 - COMMUNITY MEDICINE: SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The art and science of application of technical knowledge and skills to the delivery of health care to given community, designed in collaboration with related professionals as well as human and social science on one hand and the community on the other hand. Preventive medicine is science and art of preventing disease, prolonging life and promoting physical and mental health and efficacy.

COURSE OBJECTIVES:

- To orient the students with levels of health care, primary health centre and community health centre.
- To understand about ethics in professionalism.
- To know acts like PCPNDT, Organ transplantation etc.
- To make the students aware of tabulation of data, measuring mean and SD

SYLLABUS: (Total 100 marks- (60 theory and 40 practical)

Infectious diseases epidemiology:

- 1.Define terms- infection, contamination, infectious disease, contagious disease, communicable disease, epidemic, endemic, sporadic, pandemic, zoonotic, nosocomial, iatrogenic, eradication, control, surveillance, incubation period, isolation, quarantine.
- 2. Dynamics of disease transmission in terms of chain of infection, direct &indirect transmission, mode of disease transmission.
- 3. Methods of control with examples
- 3. Immunization, Types of immunity, types of vaccines, immunization schedule
- 4. cold chain, AEFI
- 5. Disinfection, properties of ideal disinfectant, types, examples, recommended disinfecting procedures. Disinfection and sterilization at health care centre level.
- 6. Epidemiology of Communicable diseases: TB, HIV, Tetanus, Rabies, vector borne diseases (Malaria, Dengue), food poisoning, Acute Diarrhoea, Acute Respiratory Infections
- 7 Non-communicable diseases: Risk factors for NCDs, Epidemiology, preventive measures for Hypertension, Diabetes, Cardiovascular Diseases, obesity, accidents.
- 8. Epidemiology and preventive measures of common cancers
- 9. National Health Programs:
- A) National Tuberculosis Elimination Program
- B) National Vector Borne Disease Control Program
- C) National AIDS Control Program
- D) RCH, nutritional programs, UIP,
- 10. Primary health care-definition, principles of primary health care
- 13. Primary health centre- functions, staff pattern.
- 14. Biomedical waste management: Biomedical waste Sources, hazards, categories &coding, disposal
- 15. Principles of medical ethics and common ethical issues, Medical negligence, Consumer Protection

16. Demography and Family planning:

Factors influencing population growth, Birth rate, death rate

Methods of contraception –Types, mechanism of action, advantages, disadvantages, side effects Sources of health information -Census, SRS, Registration of births and deaths.

Practical:

- 1. Hand washing technique
- 2. Communication skill Gather, ICTC-Provider initiated, Client initiated
- 3. Biomedical waste management spotters
- 4. Family planning spotters.

COURSE OUTCOMES:

After completing this course, the student should be able to

- 1. Understand levels of health care and elements & principles of primary health care
- 2. Know about functions of PHC and CHC
- 3. Understand and apply measures of central tendency and dispersion
- 4. Understand and apply statistical tests related to diagnosis

- 1. Park's Textbook of Preventive and Social Medicine latest edition
- 2. Statistics and Research: Mahajan 9th edition
- 3. Sunderlal textbook of preventive and social medicine 6th edition
- 4. Suryakanha Recent advances in community medicine 6th edition

OPTH2011 – OPTOMETRY – II:

SEMESTER: IV

(with effect from 2022-23 admitted batch)

Introduction:

BSc Optometry is a branch in allied health sciences that deals with the examination, diagnosis, and treatment of diseases and disorders of visual system. This is a challenging career with unlimited opportunities. The training will enable a student to become a competent person in providing serviceas optometrist and ophthalmic assistant.

COURSE OBJECTIVES:

By the end of this course should be able to

- 1. By the end of 4th-semester students will be able to do the examination to provide glasses to the patients
- 2. Able to understand various diseases of the eye

SYLLABUS:

S.No.	Course Title
1	Ocular Diseases-I
2	Visual Optics- II
3	Optometric Optics- II
4	Basic and Ocular Pharmacology
5	Ocular Diseases - II
6	Ocular Diseases Lab
7	Clinical Optometry-II

COURSE OUTCOMES:

- 1. Etiological classifications of various eye refractive problems of the eye with proper opticalcorrections
- 2. Etiological classifications of various eye diseases conditions and its management
- 3. Able to Definition: Materials (Glass, Plastics, Polycarbonate, Trilogy) types and Characteristics, Properties (Refractive index, specific gravity, UV cut off, impact resistance
- 4. They will be known all pharmacological usages of the eye in various diseases.

- a) AK Khurana,Indu Khurana Anatomy and Physiology of the eye -2^{nd} edition
- b) Pathology of the eye and orbit K S Ratnagar
- c) Clinical optics T E Fannin and T Grosvenor 2nd edition
- d) M Jalie principles of ophthalmic lenses
- e) Visual optics and refraction a clinical approach David D Michaels

OPTH2011 – OPTOMETRY – II:

SEMESTER: V

(with effect from 2022-23 admitted batch)

CONTACT LENSES I

INSTRUCTOR INCHARGE: B.Optom or optometrists with higher qualification.

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

COURSE OBJECTIVES: Upon completion of the course, the student should be able to:

- 1. Understand the basics of contact lenses
- 2. List the important properties of contact lenses
- 3. Finalise the CL design for various kinds patients
- 4. Recognize various types of fitting
- 5. Explain all the procedures to patient
- 6. Identify and manage the adverse effects of contact lens

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN (Total: 30 hours)

1. Introduction to Contact lenses

Definition

Classification / Types

- 2. History of Contact Lenses
- 3. Optics of Contact Lenses

Magnification & Visual field

Accommodation & Convergence

Back & Front Vertex Power / Vertex distance calculation

4. Review of Anatomy & Physiology of

Tear film

Cornea

Lids & Conjunctiva

5. Introduction to CL materials

Monomers, Polymers

- 6. Properties of CL materials
 - Physiological (Dk, Ionicity, Water content)
 - Physical (Elasticity, Tensile strength, Rigidity)
 - Optical (Transmission, Refractive index)
- 7. Indications and contraindications
- 8. Parameters / Designs of Contact Lenses & Terminology
- 9. RGP Contact Lens materials
- 10. Manufacturing Rigid and Soft Contact Lenses various methods
- 11. Pre-Fitting examination steps, significance, recording of results
- 12. Correction of Astigmatism with RGP lens
- 13. Types of fit Steep, Flat, Optimum on spherical cornea with spherical lenses
- 14. Types of fit Steep, Flat, Optimum on Toric cornea with spherical lenses
- 15. Calculation and finalising Contact lens parameters
- 16. Ordering Rigid Contact Lenses writing a prescription to the Laboratory
- 17. Checking and verifying Contact lenses from Laboratory
- 18. Modifications possible with Rigid lenses
- 19. Common Handling Instructions
 - Insertion & Removal Techniques
 - Do's and Dont's
- 20. Care and Maintenance of Rigid lenses
 - Cleaning agents & Importance
 - Rinsing agents & Importance
 - Disinfecting agents & importance
 - Lubricating & Enzymatic cleaners
- 21. Follow up visit examination
- 22. Complications of RGP lenses

PRACTICAL (Total: 30 hours)

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

LOW VISION CARE

INSTRUCTOR INCHARGE: Optometrist with Low vision clinical experience

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

COURSE OBJECTIVES: At the end of the course, the student will be knowledgeable in the following:

- 1. Definition and epidemiology of Low Vision
- 2. Clinical examination of Low vision subjects
- 3. Optical, Non-Optical, Electronic, and Assistive devices.
- 4. Training for Low Vision subjects with Low vision devices
- 5. Referrals and follow-up

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE PLAN: (Total: 15 hours)

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

PRACTICALS (Total: 15 hours)

- 1. Practical 1: Attending in low vision care clinic and history taking.
- 2. Practical 2:

Determining the type of telescope and its magnification (Direct comparison method & calculated method)

Determining the change in field of view with different magnification and different eyeto lens distances with telescopes and magnifiers.

3. Practical 3:

Inducing visual impairment and prescribing magnification.

Determining reading speed with different types of low vision aids with same magnification.

Determining reading speed with a low vision aid of different magnifications.

GERIATRIC OPTOMETRY & PAEDIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: B.Optom/ M Optom/ Ph D with adequate experience in handling geriatric patients or Ophthalmologists.

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

COURSE OBJECTIVES: The student on taking this course should

- 1. Be able to identify, investigate the age related changes in the eyes.
- 2. Be able to counsel the elderly
- 3. Be able to dispense spectacles with proper instructions.
- 4. Adequately gained knowledge on common ocular diseases.

TEXT BOOKS: A.J. ROSSENBLOOM Jr & M.W.MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.

REFERENCE BOOKS:

- 1. OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi. 2005
- 2. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
- 3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN (Total: 20 hours)

- 1. Structural, and morphological changes of eye in elderly
- 2. Physiological changes in eye in the course of aging.
- 3. Introduction to geriatric medicine epidemiology, need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)
- 4. Optometric Examination of the Older Adult

- 5. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye
- 6. Contact lenses in elderly
- 7. Pharmacological aspects of aging
- 8. Low vision causes, management and rehabilitation in geriatrics.
- 9. Spectacle dispensing in elderly Considerations of spectacle lenses and frames

PEDIATRIC OPTOMETRY

INSTRUCTOR INCHARGE: Paediatric Ophthalmologist / Optometrist

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

COURSE OBJECTIVES: At the end of the course the student is expected to:

- 1. Have a knowledge of the principal theories of childhood development, and visual development
- 2. Have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues
- 3. Be familiar with the accommodative-vergence system, the genesis of ametropia, the disorders of refraction, accommodation and vergence, and the assessment and management of these disorders
- 4. Be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus
- 5. Have a knowledge of the epidemiology of eye disease in children, the assessment techniques available for examining visual function of children of all ages and an understanding varied management concepts of paediatric vision disorders
- 6. Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.
- 7. Have a capacity for highly evolved communication and co-management with other professionals involved in paediatric assessment and care

TEXT BOOKS:

- 1. Pediatric Optometry JEROME ROSNER, Butterworth, London 1982
- 2. Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004

REFERENCE BOOKS:

- 1. Binocular Vision and Ocular Motility VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis, 1980.
- 2. Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
- 3. Clinical pediatric optometry. LJ Press, BD Moore, Butterworth- Heinemann, 1993

PREREQUISITES: Ocular anatomy, Physiology, Ocular Disease

COURSE PLAN (Total: 25 hours)

- 1. The Development of Eye and Vision
- 2. History taking Paediatric subjects
- 3. Assessment of visual acuity
- 4. Normal appearance, pathology and structural anomalies of

Orbit, Eye lids, Lacrimal system,

Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil

Lens, vitreous, Fundus Oculomotor system

- 5. Refractive Examination
- 6. Determining binocular status
- 7. Determining sensory motor adaptability
- 8. Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia
- 9. Remedial and Compensatory treatment of Strabismus and Nystagmus
- 10. Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics
- 11. Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism
- 12. Spectacle dispensing for children
- 13. Paediatric contact lenses
- 14. Low vision assessment in children

BINOCULAR VISION I

INSTRUCTOR INCHARGE: Optometrists with B. Optom and experience in Binocular vision course teaching. Or M. Optom or specialised fellowship in Binocular vision optometry.

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

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

- 1. Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.
- 2. Provide a detailed explanation of, and differentiate between the etiology, investigation and management of binocular vision anomalies.
- 3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

TEXT BOOKS:

- 1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
- 2. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
- 3. Gunter K. V. Mosby Company

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

PREREQUISITES: Ocular anatomy, Physiology

COURSE PLAN (Total: 30 hours)

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.

2. Anatomy of Extra Ocular Muscles.

Rectii and Obliques, LPS.

Innervation & Blood Supply.

3. Physiology of Ocular movements.

Center of rotation, Axes of Fick.

Action of individual muscle.

4. Laws of ocular motility

Donder's and Listing's law

Sherrington's law

Hering's law

5. Uniocular& Binocular movements - fixation, saccadic & pursuits.

Version & Vergence.

Fixation & field of fixation

6. Near Vision Complex Accommodation

Definition and mechanism (process).

Methods of measurement.

Stimulus and innervation.

Types of accommodation.

Anomalies of accommodation – aetiology and management.

7. Convergence

Definition and mechanism.

Methods of measurement.

Types and components of convergence - Tonic, accommodative, fusional, proximal.

Anomalies of Convergence – aetiology and management.

8. Sensory adaptations

Confusion

9. Suppression

Investigations

Management

Blind spot syndrome

10. Abnormal Retinal Correspondence

Investigation and management

Blind spot syndrome

11. Eccentric Fixation

Investigation and management

12. Amblyopia

Classification

Aeitiology

Investigation

Management

SYSTEMIC DISEASES

INSTRUCTOR INCHARGE: General Medicine professional

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

COURSE OBJECTIVES: At the end of the course, students should get acquainted with the following:

- 1. Common Systemic conditions: Definition, diagnostic approach, complications and management options
- 2. Ocular findings of the systemic conditions
- 3. First Aid knowledge

TEXT BOOKS:

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

COURSE PLAN (Total:45 hours)

1. Hypertension

Definition, classification, Epidemiology, clinical examination, complications, and management.

Hypertensive retinopathy

2. Diabetes Mellitus

Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications

Diabetic Retinopathy

3. Thyroid Disease

Physiology, testing for thyroid disease, Hyperthyroidism, Hypothroidism, Thyroiditis,

Thyroid tumors

Grave's Ophthalmopathy

4. Acquired Heart Disease

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

5. Cancer:

Incidence

Etiology

Therapy

Ophthalmologic considerations

6. Connective Tissue Disease

Rheumatic arthritis

Systemic lupus erythematosus

Scleroderma

Polymyositis and dermatomyositis

Sjogren syndrome

Behcet's syndrome

Eye and connective tissue disease

7. Tuberculosis

Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.

8. Herpes virus (Herepes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus)

Herpes and the eye

- 9. Hepatitis (Hepatitis A, B, C)
- 10. Acquired Immunodeficiency Syndrome
- 11. Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations)
- 12. Common Tropical Medical Ailments

Malaria

Typhoid

Dengue

Filariases

Onchocerciasis

Cysticercosis

Leprosy

13. Nutritional and Metabolic disorders:

Obesity

Hyperlipidaemias

Kwashiorkor

Vitamin A Deficiency

Vitamin D Deficiency

Vitamin E Deficiency

Vitamin K Deficiency

Vitamin B1,B2, Deficiency

Vitamin C Deficiency

14. Myasthenia Gravis

15. First Aid

General Medical Emergencies

Preoperative precautions in ocular surgeries

16. Psychiatry

Basic knowledge of psychiatric condition and Patient Management

17. Genetics

Introduction to genetics

Organisation of the cell

Chromosome structure and cell division

Gene structure and basic principles of Genetics.

Genetic disorders and their diagnosis.

Genes and the eye

Genetic counseling and genetic engineering.

RESEARCH METHODOLOGY AND BIOSTATISTICS

INSTRUCTOR INCHARGE: Biostatistician/Epidemiologist or Higher optometry holder with experience in biostatistics and research methodology

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

TEXT BOOKS:

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

COURSE PLAN (Total: 30 hours)

Research Methodology

- 1. Introduction to research methods
- 2. Identifying research problem
- 3. Ethical issues in research
- 4. Research design
- 5. Types of Data
- 6. Research tools and Data collection methods
- 7. Sampling methods
- 8. Developing a research proposal

Biostatistics

Basics of Biostatistics
 Introduction of Biostatistics
 Measures of Morality
 Sampling
 Statistical significance

Correlation

Sample size determination.

Statistics -Collection of Data - presentation including classification and diagrammatic representation -frequency distribution. Measures of central tendency; measures of dispersion.

Theoretical distributions.

Binomial

Normal Normal

Sampling –necessity of methods and techniques.

Chi. Square test (2 x 2)

- 2. Hospital Statistics
- 3. Use of computerized software for statistics

CLINICAL OPTOMETRY IV (STUDENTSHIP) Total: 45 hours

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.

SEMESTER -VI

CONTACT LENSES II

INSTRUCTOR INCHARGE: B.Optom or optometrists with higher qualification

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

COURSE OBJECTIVES: Upon completion of the course, the student should be able to:

- 1. Understand the basics of contact lenses
- 2. List the important properties of contact lenses
- 3. Finalise the CL design for various kinds patients
- 4. Recognize various types of fitting
- 5. Explain all the procedures to patient
- 6. Identify and manage the adverse effects of contact lens

TEXT BOOKS:

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

PREREQUISITES: Geometrical optics, Visual optics, Ocular Anatomy, Ocular Physiology, Biochemistry, Ocular Microbiology, Ocular Disease, Optometric Instruments

COURSE PLAN: Total: 30 hours

- 1. SCL Materials & Review of manufacturing techniques
- 2. Comparison of RGP vs. SCL
- 3. Pre-fitting considerations for SCL
- 4. Fitting philosophies for SCL
- 5. Fit assessment in Soft Contact Lenses: Types of fit Steep, Flat, Optimum
- 6. Calculation and finalising SCL parameters

Disposable lenses

Advantages and availability

7. Soft Toric CL

Stabilization techniques

Parameter selection

Fitting assessment

8. Common Handling Instructions

Insertion & Removal Techniques

Do's and Dont's

9. Care and Maintenance of Soft lenses

Cleaning agents & Importance

Rinsing agents & Importance

Disinfecting agents & importance

Lubricating & Enzymatic cleaners

- 10. Follow up visit examination
- 11. Complications of Soft lenses
- 12. Therapeutic contact lenses

Indications

Fitting consideration

13. Specialty fitting

Aphakia

Pediatric

Post refractive surgery

14. Management of Presbyopia with Contact lenses

PRACTICAL (Total: 30 hours)

- 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
- 13. Specialty Contact Lens fitting (at SN during clinics)

BINOCULAR VISION II

INSTRUCTOR INCHARGE: Optometrists with B. Optom and experience in Binocular vision course teaching. Or M. Optom or specialised fellowship in Binocular vision optometry

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

COURSE OBJECTIVES: The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose case of strabismus with comments in respect to retinal correspondence and binocular single vision. The student should be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for

TEXT BOOKS:

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

PREREQUISITES: Ocular Anatomy, Ocular Physiology, Binocular Vision –I.

COURSE PLAN: (Total: 30 hours)

1. Neuro-muscular anomalies

Classification and etiological factors

- 2. History recording and significance.
- 3. Convergent strabismus

Accommodative convergent squint

Classification

Investigation and Management

Non accommodative Convergent squint

Classification

Investigation and Management

4. Divergent Strabismus

Classification

A& V phenomenon

Investigation and Management

5. Vertical strabismus

Classification

Investigation and Management

6. Paralytic Strabismus

Acquired and Congenital

Clinical Characteristics

- 7. Distinction from comitant and restrictive Squint
- 8. Investigations

History and symptoms

Head Posture

Diplopia Charting

Hess chart

PBCT

Nine directions

Binocular field of vision

9. Amblyopia and Treatment of Amblyopia

- 10. Nystagmus
- 11. Non-surgical Management of Squint
- 12. Restrictive Strabismus

Features

Musculo-fascical anomalies

Duane's Retraction syndrome

Clinical features and management

Brown's Superior oblique sheath syndrome

Strabismus fixus

Congenital muscle fibrosis

13. Surgical management

PRACTICAL (Total: 15 hours): Deals with hand-on session the basic binocular vision evaluation techniques.

PUBLIC HEALTH AND COMMUNITY OPTOMETRY

INSTRUCTOR INCHARGE: Public Health professional or optometrist with public health and community optometry experience

COURSE DESCRIPTION: Introduction to the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario.

COURSE OBJECTIVES: At the end of the course students will be be knowledgeable in the following areas:

- 1. Community based eye care in India.
- 2. Prevalence of various eye diseases
- 3. Developing Information Education Communication materials on eye and vision care for the benefit of the public
- 4. Organize health education programmes in the community
- 5. Vision screening for various eye diseases in the community and for different age groups.

TEXT BOOKS:

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

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

PREREQUISITES: Ocular Disease, Visual optics, Optometric Instruments, Clinical Examination of Visual System

COURSE PLAN (Total: 30 hours)

- 1. Public Health Optometry: Concepts and implementation, Stages of diseases
- 2. Dimensions, determinants and indicators of health
- 3. Levels of disease prevention and levels of health care patterns
- 4. Epidemiology of blindness Defining blindness and visual impairment
- 5. Eye in primary health care
- 6. Contrasting between Clinical and community health programs
- 7. Community Eye Care Programs
- 8. Community based rehabilitation programs
- 9. Nutritional Blindness with reference to Vitamin A deficiency
- 10. Vision 2020: The Right to Sight
- 11. Screening for eye diseases
- 12. National and International health agencies, NPCB
- 13. Role of an optometrist in Public Health
- 14. Organization and Management of Eye Care Programs Service Delivery models
- 15. Health manpower and planning & Health Economics
- 16. Evaluation and assessment of health programmes
- 17. Optometrists role in school eye health programmes
- 18. Basics of Tele Optometry and its application in Public Health
- 19. Information, Education and Communication for Eye Care programs

PRACTICE MANAGEMENT

INSTRUCTOR INCHARGE: Management professional with masters' qualification in Management or Optometrist with experience of running private clinical services

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

COURSE OBJECTIVES: 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

PREREQUISITES: Basic Clinical experience

COURSE PLAN (Total: 15 hours)

1. Business Management:

Practice establishment and development

Stock control and costing

Staffing and staff relations

Business computerization

2. Accounting Principles

Sources of finance

Bookkeeping and cash flow

3. Taxation and taxation planning

4. Professionalism and Values

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

Personal values- ethical or moral values

Attitude and behaviour- professional behaviour, treating people equally

Code of conduct, professional accountability and responsibility, misconduct

Differences between professions and importance of team efforts

Cultural issues in the healthcare environment

OCCUPATIONAL OPTOMETRY

INSTRUCTOR INCHARGE: Occupational Health professional and /or Optometrist with experience in occupational eye health

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

COURSE OBJECTIVES: At the end of the course the students will be knowledgeable in the following aspects:

- 1. In visual requirements of jobs;
- 2. In effects of physical, chemical and other hazards on eye and vision;
- 3. To identify occupational causes of visual and eye problems;
- 4. To be able to prescribe suitable corrective lenses and eye protective wear and
- 5. To set visual requirements, standards for different jobs.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

COURSE PLAN: (Total: 15 hours)

1. Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc.

Acts and Rules - Factories Act, WCA, ESI Act.

- 2. Electromagnetic Radiation and its effects on Eye
- 3. Light Definitions and units, Sources, advantages and disadvantages, standards
- 4. Color Definition, Color theory, Color coding, Color defects, Color Vision tests
- 5. Occupational hazards and preventive/protective methods
- 6. Task Analysis
- 7. Industrial Vision Screening Modified clinical method and Industrial Vision test
- 8. Vision Standards Railways, Roadways, Airlines
- 9. Visual Display Units
- 10. Contact lens and work

MEDICAL LAW AND ETHICS

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

COURSE PLAN (Total: 15 hours)

Few of the important and relevant topics that need to focus on are as follows:

- 1. Medical ethics Definition Goal Scope b
- 2. Introduction to Code of conduct
- 3. Basic principles of medical ethics Confidentiality
- 4. Malpractice and negligence Rational and irrational drug therapy
- 5. Autonomy and informed consent Right of patients
- 6. Care of the terminally ill- Euthanasia
- 7. Organ transplantation
- 8. 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.
- 9. Professional Indemnity insurance policy
- 10. Development of standardized protocol to avoid near miss or sentinel events
- 11. Obtaining an informed consent

RESEARCH PROJECT/DISSERTATION Total: 30 hours

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

Project is spread through sixth to eighth semester.

CLINICAL OPTOMETRY V (STUDENTSHIP) Total: 45hours

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.