GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM | HYDERABAD | BENGALURU

Accredited by NAAC with A^{++} Grade

Regulations and Syllabus of

B.Sc. OPTOMETRY

(W.e.f. 2023-2024 admitted batch)

B.Sc.OPTOMETRY

(Effective from 2023-24 Admitted batch)

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

- Foundation Course (FC)
- Core course (C)

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-playgroup 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, Community medicine, General Medicine, General Surgery & Parent Department-

100 marks each

Theory : 60 marks

Practical : 40 marks (Practical: 30marks + Viva-voce: 10marks)

b. English, Psychology, EVS, Computer - 40 marks each

Theory : 40 marks

c. Pattern of question paper

60 marks paper (Duration: 2 ½ Hours)

1 Q	Essay	(1x 10m = 10 marks)
2 Q to 5 Q	Short notes	(total 4 Q, 4 x 5 m = 20 marks)
6 Q to 15 Q	very short notes	(total 10 Q, 10 x 3m = 30marks)

40 marks paper (Duration: 2 hours)

1 Q	Essay question	(1 x10 m = 10 marks)
2 Q to 4 Q	Short notes	(3 Q x 5 = 15marks)
5 Q to 9 Q	Very short notes	(5 Q x 3 m = 15marks)

PAPER SETTING

Paper setting, paper valuation and practical examination is done by internal examiners from the I to VI semesters.

CRITERIA FOR EXAMINER

- Professor or Associate Professor or Assistant Professor with minimum of 2years of teaching experience after post-graduation are eligible to be as examiners

Grace Marks: Maximum 5 marks can be awarded to one subject provided he passedall the other subjects or these 5 marks can be split for maximum 2 subjects. Providedthe candidate has passed rest of the subjects.

A candidate shall be declared to have passed the examination if…

(a) He / She secured 40% marks in theory.
(b) 50% marks in practical & viva
(c) 50% marks in theory, practical & viva put together in each subject separately.

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.

SUBJECTS FOR SEMESTER EXAMS WITH HOURS AND CREDITS

Semester - I									
SI.No.	**Subject Code**	**Subject**	**Hours**			**Credits**			**Course Type**
			Theory	Practical	Total	Theory	Practical	Total	
1	23ANAT1001	Anatomy - I	30	15	45	2	0.5	2.5	C
2	23BCHE1001	Biochemistry	30	30	60	2	1	3	C
3	23PSGY1001	Physiology - I	30	30	60	2	1	3	C
4	LANG1141	English	30		30	2		2	FC
5	PSYC1031	Psychology	15		15	1		1	FC
6	CSCI1301	Computer Basics	30		30	2		2	FC
7	ENVS1051	Environmental Science	15		15	1		1	FC
8	23OPTH1001	Optometry Clinical-I		255	255		8.5	8.5	C
		Total	**180**	**330**	**490**	**12**	**11**	**23**	
Semester -II									
1	23ANAT2001	Anatomy - II	30	30	60	2	1	3	C
2	23PSGY2001	Physiology - II	60	30	90	4	1	5	C
3	23OPTH2001	Optometry Clinical-II		300	300		10	10	C
		Total	**120**	**360**	**480**	**6**	**12**	**18**	
Semester - III									
1	23PHCG1001	Pharmacology - I	15	15	30	1	0.5	1.5	C
2	23MIBG1001	Microbiology - I	30	15	45	2	0.5	2.5	C
3	23PATH1021	Pathology - I	30	15	45	2	0.5	2.5	C
4	23CMED1001	Community Medicine - I	30	15	45	2	0.5	2.5	C
5	23NURS1001	Basics of Patient care & Hospital orientation	15		15				FC
6	23OPTH2011	Optometry- I	15	345	360	1	11.5	12.5	C
		Total	**135**	**405**	**540**	**8**	**13.5**	**21.5**	
Semester - IV									
1	23PHCG2001	Pharmacology - II	15	15	30	1	0.5	1.5	C
2	23MIBG2001	Microbiology - II	15	30	45	1	1	2	C

3	23PATH2021	Pathology - II	15	15	30	1	0.5	1.5	C
4	23CMED2001	Community Medicine - II	30	15	45	2	0.5	2.5	C
5	23OPTH2021	Optometry- II	15	360	375	1	12	13	C
		Total	**90**	**435**	**555**	**6**	**14.5**	**20.5**	
Semester – V									
1	23OPTH3001	Ocular Diseases & Ocular Pharmacology	15	30	45	1	1	2	C
2	23OPTH3011	Contact Lenses	15	30	45	1	1	2	C
3	23OPTH3021	Optometry – III	45	180	225	3	6	9	C
4	23OPTH3031	Optometry - IV	45	180	225	3	6	9	C
		Total	**120**	**420**	**540**	**8**	**14**	**22**	
Semester – VI									
1	23OPTH3041	Optometry - V	60	120	180	4	4	8	C
2	23OPTH3051	Optometry- VI	60	120	180	4	4	8	C
3	23OPTH3061	Optometry- VII	60	120	180	4	4	8	C
			180	**360**	**540**	**12**	**12**	**24**	
TOTAL								**129**	

SEMESTER - I

ANATOMY - I

23ANAT1001

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

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 10

Theory:

UNIT	CONTENT	No. OF HOURS
I	Introduction to anatomical terms and organization of the human body Introduction to anatomical terms relative to position – anterior, ventral, posterior dorsal, superior, inferior, median, lateral, proximal, distal, superficial, deep, prone, supine, palmar and plantar Anatomical planes (axial/ transverse/horizontal, sagittal/vertical plane and coronal/frontal/oblique plane) Movements (flexion, extension, abduction, adduction, medial rotation, lateral rotation, inversion, eversion, supination, pronation, plantar flexion, dorsal flexion and circumduction Cell structure, Cell division, Tissue - definition, types, characteristics, classification, location Hyaline, fibro cartilage, elastic cartilage, Histology of Bone, Features of skeletal, smooth and cardiac muscle.	5
II	The Respiratory system Structure of the organs of respiration, , Pleura, Morphology of Lungs, Broncho Pulmonary Segments, Histology of Lungs	5
III	Cardiovascular system Morphology of Heart, Internal features of Heart – right atrium and right ventricle Chambers &	8

	Openings of the heart, Types of Circulation, Coronary Circulation, Aorta and its branches	
IV	Muscular system types of muscles Muscles of Upper Limb, Muscles of back, diaphragm, Muscles of arm, Muscles of Forearm Significance of Deltoid Muscle, Muscles of Lower Limb, Muscles of thigh, Muscles of Leg	5
V	Muscular system types of muscles Muscles of Upper Limb, Muscles of back, diaphragm, Muscles of arm, Muscles of Forearm, Significance of Deltoid Muscle, Muscles of Lower Limb, Muscles of thigh, Muscles of Leg Significance of Gluteus Maximus Muscle, Blood vessels of Upper Limb : Arm- Axillary artery, brachial artery fore Arm - Radial artery, ulnar Artery, medial cubital vein, Blood vessels of Lower Limb : Thigh femoral artery, popliteal artery	5

Practical:

UNIT	CONTENT	No. OF HOURS
I	Microscopy, Histology of tissues – cartilage, Bone and Lung	2
II	Intercostal space, Heart, Lungs	3
III	Upper Limb – Bones, Muscles, Axillary artery, brachial artery, fore Arm - Radial artery, ulnar Artery, medial cubital vein, Nerves : Axillaries Nerve , Median Nerve, Ulnar Nerve, radial Nerve	4
IV	Lower Limb – Bones, Muscles, Thigh femoral artery, popliteal artery Nerves of Lower Limb: Femoral Nerve, Sciatic Nerve, Obturator Nerve	4
V	Normal X- Rays, Surface markings	2

Course Outcomes:

- Explains knowledge on the basic anatomy of various regions like limbs, thoracicand 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 ofa 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 – 3rd edition

BIOCHEMISTRY

23BCHE1001

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

Credits: Theory 02 & Practical 1.0

Hours: Theory 30 & Practical 30

THEORY	CONTENT	No. OF HOURS
UNIT - I		
Cell biology Nucleotide and Nucleic acid chemistry Enzymes	Recall the structure and functions of the cell and cell membrane. List intracellular organelles and mention their functions. Show nucleotide composition and list functions of free nucleotides in body Compare between DNA & RNA, explain structure and functions of DNA & RNA (tRNA, rRNA, mRNA) Define and classify with examples, active site, cofactor, proenzyme ii.List the factors affecting enzyme activity Define isoenzymes, enzymology (clinical significance of enzymes)	1 1 3
UNIT – II		

Carbohydrate Chemistry & Metabolism	Define carbohydrates, classify carbohydrates with examples, explain glycosidicbond Illustrate composition, sources, and functions of monosaccharides, disaccharides, oligosaccharides, and polysaccharides. Illustrate glycolysis-aerobic, anaerobic, citric acid cycle, substratephosphorylation Elaborate glycogen metabolism -glycogenesis, glycogenolysis, metabolicdisorders of glycogen, gluconeogenesis, Cori cycle. Summarize hormonal regulation of glucose, glycosuria, diabetes mellitus	4
Lipid Chemistry& Metabolism	Define and classify lipids, Functions of Fatty acids, Triacylglycerol, Phospholipids, cholesteroliii.Essential fatty acids and their importance, Explain Lipoproteins: definition, classification, function, ketone bodies. Fat metabolism in adipose tissues Elaborate ketone body metabolism: formation(ketogenesis),utilization(ketolysis), ketosis, Rothera's test. Summarize cholesterol metabolism: synthesis, degradation, cholesteroltransport. Define Hypercholesterolemia, list its effects, causing agents commonhyperlipoproteinemia, Lipoproteins. Explain about fatty liver	4
UNIT - III		
Amino -acid Chemistry & Amino acid and protein metabolism	Define and classify amino acids Define peptides and explain peptide bonds, list the biologically importantpeptides. Define and classify proteins, enumerate functions of proteins. Define Catabolism of amino acids- transamination, deamination Illustrate fate of ammonia, transport of ammonia, Urea cycle Outline the specialized products formed from amino acids	3
UNIT - IV		
Vitamins	Define vitamins and classify them according to solubility. List the sources, Coenzyme forms, functions, Recommended Dietary Allowance(RDA). Tell about digestion, absorption and transport, deficiency and toxicity ofindividual vitamins	4
Mineral metabolism	Define minerals and list the sources for mineral and their Recommended Dietary Allowance. Tell about digestion, absorption, transport, excretion of various minerals List the functions and disorders of individual minerals – Calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper	4
UNIT - V		
Acid-base balance	Define acids, base and pH. Define buffers and describe buffer systems of the body (bicarbonate buffersystem). Elaborate about the role of lungs and kidneys in acid-base balance.iv.Acid base disorders	2
FUNCTION TESTS	Describe the biochemical functions of kidney and the principal RenalFunction Tests Describe the biochemical functions of liver and the principal Liver FunctionTests	2
Hemoglobin Chemistry & Metabolism	I.Describe briefly the normal structure and function of Hemoglobin. ii.Hemoglobin synthesis and breakdown. List out the important abnormal hemoglobins and their effect	2

PRACTICAL	PRACTICAL TOPICS – DEMONSTRATIONS	No. OF HOURS
UNIT – 1	Lab safety & Glass ware	6
UNIT - 2	Centrifuge	6
UNIT – 3	Sample Collection, Blood, Anticoagulants, Random urine sample, 24 hours urine sample, Preservatives	6
UNIT – 4	Urine Analysis – Normal constituents (Organic & Inorganic) &Abnormal constituents (Demo)	6
UNIT – 5	Serum Analytes – Significance of Blood Glucose, Significance of Blood Urea, Significance of Serum Creatinine,Significance of Electrolytes	6

Course Outcomes:

- At the end of this course student should be able
- To know the properties, classification and metabolism of carbohydrates
- To know the properties, classification and metabolism of proteins
- To know the properties, classification and metabolism of lipids
- To know the properties, classification and metabolism of nucleic acids
- To know the properties, classification and metabolism of enzymes andvitamins

References:

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

PHYSIOLOGY - I

23PSGY1001

INTRODUCTION

Physiology is the study of functions and mechanisms in a living system. Physiology focuses on individual organs, cells, and bio molecules 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

Credits: Theory 02 & Practical 1

Hours: Theory 30 & Practical 30

THEORY	CONTENT	No. OF HOURS
UNIT - I		
Cell Physiology Immunity	Describe the structure and functions of cell, Describe the functions of the cell organelles, Describe briefly the types of transport across cell membrane and carrier systems. Define immunity and describe the types of immunity, Classify antigen & antibodies Describe T cell immunity & B cell immunity	3 2
UNIT - II		
Blood Physiology	Describe the normal composition of human blood and its functions Describe the normal plasma proteins & their functions Describe the structure and functions of RBC and hemoglobin Describe the process of Erythropoiesis Describe the Structure, production, & functions of WBCs Describe the structure, production & functions of Platelets Describe the Types of blood groups and their importance, Describe the Mechanism of coagulation	8
UNIT - III		
Digestive System	Describe briefly the Physiological anatomy of G.I.T and its functions. Describe briefly the composition and functions of Saliva Describe briefly the physiological anatomy of the stomach and the composition, functions of gastric juice. Describe briefly the functions of pancreas, and the composition & functions of pancreatic juice. Describe briefly the functions of liver and gall bladder and the Composition, and	7

	functions of bile juice	
UNIT - IV		
Respiratory System	Describe the physiological structure and functions of Respiratory tract. Describe the Mechanics of respiration and its regulation Describe the Fundamentals of oxygen and CO2 transport in blood Describe the lung volumes, spirometry & their importance	5
UNIT - V		
Cardiovascular System	Describe the gross structure of heart and the normal circulation of blood Describe the cardiac cycle Describe the normal arterial pulse wave and the normal heart rate, and factors increasing and decreasing it. Describe normal Blood pressure and its regulation, Describe the normal Heart sounds Describe the normal ECG and its importance	5
PRACTICAL	**CONTENT**	**No. OF HOURS**
UNIT – I	Estimate Hemoglobin in given blood sample, Estimate bleeding time & clotting time	8
UNIT – II	Measure ESR of given blood sample, Perform RBC count of given blood sample	8
UNIT – III	Perform WBC count of given blood sample Perform a differential WBC count of the given sample	4
UNIT – IV	Calculation of blood indices, Determination of Blood Groups	4
UNIT – V	Measure pulse rate, heart rate, Measure BP, respiratory rate & temperature	6

Course Outcomes:

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

References:

- Textbook of physiology for BDS AK Jain 6th edition
- Textbook of physiology for BDS Sembulingam 3rd edition
- Physiology in nutshell by AK Jain 5th edition

ENGLISH

LANG1141

INTRODUCTION:

The course is a unified approach to enhance language skills of learners with an aim to honetheir 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

- Understand and communicate in simple English, written and verbal
- Understand and practice the basic principles of English grammar
- Comprehend and summarize a given English essay/paragraph
- Understand common English terms used in the medical/ health care field

SYLLABUS

Credits: 02 & Hours:30

THEORY	CONTENT	No. OF HOURS
UNIT - I 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	3hrs
UNIT - II Prescribed Poetry	1. William Shakespeare: The Seven Ages of Man 2. Robert Frost: The Road not Taken 3. John Milton: On his Blindness	3hrs
UNIT – III Basic English Grammar	Grammar - 8 parts of speech. Structure of sentence. Sentence writing. Paragraph writing. Summarizing / precis writing. Reading & comprehension (a small paragraph followed by questions).	4hr
UNIT – IV	General English Vocabulary & Use of dictionary Common Medical Terminology Spoken & Written English	2hr 2hr 2hr
UNIT – V	Listening & Reading skills English comprehension & summarizing & inference Writing skills - Questions based on prescribed prose/ poetry, letter, Summary, Medical Report, Documentation, Case history, Note taking Verbal communication - discussion & summarizing. Taking minutes of meeting.	2hr 2hr 8hr 2hr

Course Outcomes

- By the end of the course, the learners will be able to:
- Think critically, analytically, creatively and communicate confidently in English insocial and professional contexts with improved skills of fluency and accuracy.
- Write grammatically correct sentences employing appropriate vocabulary suitableto 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:

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

PSYCHOLOGY

PSYC1031

Introduction:

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

Course Objective

The objective of this course is:

- To enable the student to enlist common mental health issues encounteredin general health care settings.

Learning Outcomes

- The course enables the student to:
- Identify psychological distress states in the general health setting.
- Distinguish between psychotic and non-psychotic disorders.

SYLLABUS

Credits: Theory 01 & Hours: 15

UNIT	CONTENT	THEORY HOURS
I	Behaviors that Cause Concern – Violent Behavior and Aggression; Confusion and Agitation; Suicide; Seizures; Disturbances Among the Elderly.	03
II	Symptoms that are Medically Unexplained – Multiple Physical Complaints; Fear and Panic; Sleep Problems; Fatigue; Loss of a Body Function.	03
III	Problems Arising from Loss and Violence – Trauma; Intimate Partner Abuse; Sexual Assault; Bereavement.	03
IV	Problems in Childhood and Adolescence – Learning Disturbances; ADHD; Child Abuse; Misbehavior; Enuresis;	03
V	Mental Health in Other Contexts – Reproductive Health; Health of Prisoners; Refugees; Disasters; Caring for Carers.	03

Textbook

Patel, V. (2003). *Where there is No Psychiatrist. A Mental Health Care Manual*. Glasgow: Gaskell.

Reference Books

- Goldberg, D.P. (1992). *Common Mental Disorders: A Bio-Social Model*. London: Routledge.
- Helzer, J.E. & Hudziak, J.J. (2002). *Defining Psychopathology in the 21st Century: DSM V and Beyond*. Washington DC: American Psychiatric Publishing Inc.
- Pilgrim, D. (2014). *Key Concepts in Mental Health*. London: Sage.

Journals

- International Journal of Mental Health
- Community Mental Health Journal

BASICS OF COMPUTERS

CSCI1301

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:

To build necessary concepts regarding the architecture of a computer

To develop an understanding of the common application software.

To understand the uses of computers in everyday life.

SYLLABUS

Credits: 02 & Hours:30

UNIT	CONTENT	HOURS
I	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	5
II	1. Mention the common types of files including Word documents, Spreadsheets (Excel) and Presentations (PowerPoint) and their uses 2. Basic Network connecting 3. Explain the uses of the internet and email 4. Collaborative work using Google suite of applications / Microsoft Office 365	5
III	1. Demonstrate use of a computer for common purposes 2. Demonstrate methods for Data storage & retrieval and making folders; 3. Perform functions like date/time setting or changing, change display settings, Installing /removing programs etc. 4. Understand and Use MS Word / Word Document program 5. 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) 6. Understand and Use MS Excel / Data spreadsheet 7. 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. 8. Prepare and use computer-based presentations like PowerPoint with appropriate fonts and colors including insertion of images, videos etc.	10
IV	1. Prepare an appropriate file like excel to enter patient data and retrieve it 2. Use the facility of Mail Merge between Excel to a Word document 3. Sending customized email to selected members. 4. Prepare a patient report and take a print out	5
V	1. Prepare a database of patient info and lab results for storage and later retrieval 2. Communicate by e-mail including opening email account 3. Demonstrate use of search engines / Google search etc. for academic information	5

Learning Outcomes:

- At the end of the training program, the student would be able to
- Classify various components of the computer.
- Experiment with the various application software of Microsoft Office suite.
- 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

ENVIRONMENTAL SCIENCE

ENVS1051

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 :

- To impart knowledge on natural resources and its associated problems.
- To familiarize learners about ecosystem, biodiversity, and their conservation.
- To introduce learners about environment pollution.
- To acquaint learners on different social issues such as conservation of water, green building concept.
- To make learners understand about the present population scenario, its impacts and role of informational technology on environment and human health.
- To make learners understand about the importance of field visit.

SYLLABUS

Credits: 01 & Hours: 15

UNIT	CONTENT	HOURS
UNIT – I Multidisciplinary nature of environmental studies:	Definition, scope and importance. Need for public awareness.	01
UNIT – II Natural Resources	Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, timber extraction. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits, and problems. Mineral resources: environmental effects of mining. Food resources: World food problems, overgrazing, fertilizer-pesticide problems. Energy resources: use of alternate energy sources. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	03
UNIT – III Environmental pollution	Definition Causes, effects, and control measures of: Air pollution. Water pollution. Soil pollution. Thermal pollution. Solid waste Management: Causes, effects, and control measures of urban and industrial wastes. Cyclone, and landslides; Role of an individual in prevention of pollution.	03

UNIT – IV Ecosystem and biodiversity	**Ecosystem:** Structure components of ecosystem: Biotic and Abiotic components. Functional components of an ecosystem: Food chains, Food webs, Ecological pyramids, Ecological succession. Introduction, types, structure and function of Forest ecosystem. Aquatic ecosystems (ponds, streams, lakes, rivers). **Biodiversity:** Definition, genetic, species and ecosystem diversity. Biogeographical classification of India, Values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega – diversity nation. Hot-spots of biodiversity. Threats to biodiversity, Conservation of biodiversity.	03
UNIT – V Social issues and Environmental legislation	From Unsustainable to Sustainable development Urban problems related to energy. Water conservation, rainwater harvesting and water shed management. Resettlement and rehabilitation of people; its problems and concerns related Environmental ethics. Role of Information Technology in Environment and human health. Environment Legislation. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Environmental Protection Act, Issues involved in enforcement of environmental legislation. Public awareness.	05

Pedagogy tools: Blended learning, Case let, video lectures, self-reading

Text Book(s):

1. Erach Bharucha. 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. Dave D Katewa S.S. Textbook of Environmental Studies, 2nd Edition. Cengage Learning India. 2012.

Additional Reading

Benny Joseph. Textbook of Environmental Studies 3rd edition, McGraw Hill Publishing company limited. 2017.

Reference Book(s):

1. McKinney M.L., Schoch R.M., Yonavjak L. Mincy G. Environmental Science: Systems and Solutions. Jones and Bartlett Publishers. 6th Edition. 2017.

2. Botkin D.B. Environmental Science: Earth as a Living Planet. John Wiley and Sons. 5th edition. 2005.

Journal(s):

https://www.tandfonline.com/loi/genv20

https://library.lclark.edu/envs/corejournals

Website(s):

https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf

Learning Outcome:

List different natural resources and their uses.
Relate how the over-exploitation of natural resources impact human life
Find the role of an individual in the conservation of natural resources.
Recall the demand of potable water in a community.
Explain the equitable use of natural resources for sustainable lifestyles.
Demonstrate how ecosystem functions.
Summarize the structure and function of terrestrial and aquatic ecosystems.
Explain the values and threats to biodiversity.
Identify the importance of conservation of biodiversity.
Identify causes, effects, and control measures of pollution (air, water & soil).
Improve wasteland reclamation.
Analyze the role of an individual in prevention of pollution.
Solve disaster management issues of cyclone, and landslides.
Examine different water conservation methods.

OPTOMETRY CLINICAL-I

23OPTH1001

SYLLABUS Practical: Credits: 8.5 & Hours: 255

CONTENT	HOURS
Unit I: Geometrical Optics-I Nature of light–light as electromagnetic oscillation–wave equation; ideas of Sinusoidal oscillations–simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase.Sources of light; Electromagnetic Spectrum.Polarized light; linearly polarized light and circularly polarized light.Intensity of polarized light; Malus' Law; polarizer and analyzers; Methods of producing polarized light; Brewster's angle.Birefringence; ordinary and extraordinary rays.	51
Unit II: Coherence; interference; constructive interference, destructive interference; Fringes; fringe width, relationship between amplitude and intensity Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc. Resolution of an instrument (telescope, for example); Raleigh's criterion Scattering; Raleigh's scattering; Tyndall effect.	51
Unit III: Fluorescence and Phosphorescence. Basics of Lasers –coherence, population inversion, spontaneous emission. Einstein's theory of lasers. Radiometry, solid angle, radiometric units,photopic and scotopic luminous efficiency and efficacy curves; Photometric units Inverse square law of photometry. Lambert's law. Other units of light measurement; retinal illumination; Trolands Nature of light – light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index. Wave fronts – spherical, elliptical and plane; Curvature and vengeance; rays; convergence and divergence in terms of rays and vengeance; vengeance at a distance Refractive index; its dependence on wavelength, Fermat's and Huygens Principle – Derivation of laws of reflection and refraction (Snell's law) from these principles	51
Unit IV: Plane mirrors – height of the mirror; rotation of the mirror Reflection by a spherical mirror – paraxial approximation; sign convention; derivation of vengeance equation, Imaging by concave mirror, Imaging by convex mirror**,** Reflectivity; transitivity, Snell's Law. Refraction at a plane surface, Glass slab; displacement without deviation; displacement without dispersion. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism Prisms; angular dispersion; dispersive power; Abbe's number. Definition of crown and flint glasses; materials of high refractive index.Thin prism – definition; definition of Prism diopter. Deviation produced by a thin prism; it dependence on refractive index.	51

Unit V: Refraction by a spherical surface; *sign convention*; introduction to spherical aberration using image formed by a spherical surfaceof a distance object; *sag formula* Paraxial approximation; Derivation of vengeance equation. Imaging by a positive powered surface.Imaging by a negative powered surface.Vengeance at a distance formula.Effectivity of a refracting surface.	51

SEMESTER – II

ANATOMY – II

23ANAT2001

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

Credits: Theory 02 & Practical 1

Hours: Theory 30 & Practical 30

Theory:

UNIT	CONTENT	No. OF HOURS
I	The Nervous system Review Structure of neurons; CNS, ANS and PNS (Central, autonomic and peripheral) – Peripheral nerves , Brachial, Lumbar, Sacral plexus, Covering of brain, Surfaces and lobes of cerebrum white fibers of cerebrum, cranial nerves, brain stem, spinal cord - spinal nerves, functional areas of cerebral cortex, Ventricular system – formation, circulation, and drainage	9
II	Gastro Intestinal Tract Stomach morphology, blood supply, applied aspects Liver morphology, ligaments blood supply applied aspects, porta hepatitis Small and large intestine, appendix and appendicitis	5
III	The Excretory system & Reproductive system Morphology , relations and internal Structure of kidney, urethra Components of female reproductive system, Morphology of uterus and its supports Parts of Fallopian Tube, Layers of scrotum, Anatomy of Testis and its coverings Spermatic cord, Male urethra & its parts	7
IV	The Endocrine system Endocrine glands, Structure of Hypothalamus, Pineal Gland, Pituitary gland- Dwarfism Thyroid- Goiter, Parathyroid, Pancreas – Diabetes Mellitus, Adrenal glands, Gonads	5
V	The Sensory organs Receptors, Structure of skin, Eye - Anatomy of orbit and eyeball, Anatomy of Nose, Anatomy of ear, Anatomy of tongue	4

Practical:

UNIT	CONTENT	No. OF HOURS
I	Histology of Liver, Thyroid, Kidney	6

II	Liver, Stomach, Intestines	6
III	Spleen, Kidney	4
IV	Brain, Spinal card	6
V	Bony Pelvis, Skull, Normal X- Rays, Surface markings	8

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 andblood 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(McGraw-Hill)

PHYSIOLOGY – II

23PSGY2001

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

Credits: Theory 04 & Practical 1

Hours: Theory 60 & Practical 30

Theory:

UNIT	CONTENT	No. OF HOURS
I	Describe the physiological structure of muscle tissue and its types Describe the parts of neuron and their functions, and the synapse and its function Describe the action potential, its basis, refractory period, latent period, etc. and neuromuscular transmission Describe briefly the autonomic nervous system and the functions and effects of the sympathetic and parasympathetic nervous systems Describe the physiological anatomy of the brain and functions of different lobes Describe briefly the structure and functions of spinal cord Describe briefly the subdivisions of brain stem and their functions Describe briefly the special senses and their pathways – vision, audition (& olfaction & taste) Describe the normal EEG, Describe briefly the CSF formation, circulation, properties, composition and functions	16
II	Describe the physiological anatomy of Thyroid gland, functions and its applied physiology Describe the physiological anatomy of Adrenal gland, functions and its applied physiology Describe the physiological anatomy of Parathyroid gland, functions and its applied physiology	10

	Describe the physiological anatomy of Pancreas, its functions and its applied physiology Describe the physiological anatomy of hypothalamus and the Pituitary gland, their8 functions and its applied physiology	
III	Describe the physiological structure of kidney and the nephron and its functions Describe the GFR and factors affecting GFR Describe the Substances absorbed and secreted from renal tubules Describe the various Renal function tests Describe briefly the Urinary bladder and its functions and the physiology of micturition	10
IV	Describe the Structure and functions of skin Describe the structure and formation of bone Describe the structure and formation of cartilage Describe the types of joints.	14
V	Describe the Physiology of Puberty Describe the process of menstruation, normal menstrual cycle, menarche and menopause. Describe briefly the process of Ovulation and methods of determination of ovulation Describe briefly the normal physiology of pregnancy and mention the diagnostic tests for pregnancy and their physiological basis Describe briefly the functions of placenta and pregnancy diagnostic tests List out the Contraceptive methods in male and female Describe the Spermatogenesis	10
Practical		
I	Demonstrate examination of heart – inspect JVP, localize apex beat, look for any abnormal pulsations, percuss cardiac dullness, auscultate heart for normal sounds	6
II	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	6
III	Demonstrate examination of the cranial nerves Demonstrate examination of the motor system – bulk, tone, power of different groups of muscles, coordination, and gait	6
IV	Demonstrate the various sensory and motor reflexes - abdominal, plantar, biceps, triceps, supinator, knee, and ankle Demonstrate examination of sensory system – fine touch, pain, vibration	8
V	Record an ECG Measure weight and height and calculate Body Mass Index Assist in the recording of an EEG Perform spirometry in a given individual and interpret the values	4

REFERENCE BOOKS

- Human Anatomy & Physiology for Nursing – Mahindra Kumar Anand & Meena Verma Understanding Human Anatomy & Physiology – William Davis (McGraw Hill) Anatomy & Physiology – Kaarna Muni Shekhar
- Textbook of Physiology for BDS students - Dr Jain
- Textbook of Physiology for BDS students – Dr Sambulingam
- Handbook of Human Physiology – Vidya Ratan
- Concise Medical Physiology – Sujith K Choudhari

OPTOMETRY CLINICAL –II

23OPTH2001

SYLLABUS - Credits: Practical 10 & Hours: 300

UNIT	CONTENT	HOURS
I	**GEOMETRIC OPTICS-II**: Definition of a lens as a combination of two surfaces; definitions of front and back vertex powers; Newton's formula; linear magnification; angular magnification Nodal Planes Cylindrical Lenses; image formation; relation between cylinder axis and line image orientation. Imaging due to two cylinders in contact with axes parallel. Two cylinders in contact with axes perpendicular; line images and their orientations to the cylinders' powers; Interval of Sturm; circle of least confusion (CLC); spherical equivalent; position of CLC. Spherical lens and a cylindrical lens in contact; spherical equivalent; interval of Sturm and CLC .Sphereo-cylindrical lens notations– plus/minus cylinder form, cross cylinder/meridian form; transformations between them. Field stops and apertures; entrance and exit pupils. Apertures and defocus blur, Receiver/detector diameter; Depth of focus, Depth of field. Chromatic aberrations.	60
II	**Telescopes :** Telescopes– Keplerian, Galilean and Newtonian; position of cardinal points, entrance and exit pupils; magnifications; advantages and disadvantages. Microscopes–magnification, tube-length. Gullstrand's Schematic Eye(GSE). Calculation of the power of the cornea,the lens and the eye, axial length, Calculation of the position of the cardinal points, magnification. GSE-Purkinje images and their reflectance.GSE-entrance and exit pupils for a 3mm pupil; ocular aberrations– spherical aberrations and coma, chromatic aberrations. GSE–introduction to refractive errors-myopia and hyperopia; corneal curvature; axial length; far point; blur-size calculations; corrections; astigmatism; blur size; circle of least confusion; correction. GSE-Object closer than at infinity; Introduction to accommodation; far-point; near-point; presbyopia; spectacle and contact lens corrections- comparison of magnification.	60
III	**OCULAR ANATOMY :** Cornea: Anatomy of all the layers, cellular structure, nerve supply, reason for transparency, refractive properties. Coats of eyeball**:** Sclera (epi sclera & sclera)**,** Choroid (Iris, ciliary body, choroid)**,** Retina. Detailed anatomy, cellular structure, vasculature, nerve supply for all the above coats, pupils, nerve supply for papillary actions, papillary pathway, Crystalline lens, Aqueous, anterior chamber, vitreous body. Ocular Embryology , Detailed study of orbit, Ocular Adnexa and lachrymal system, Extra ocular muscles (anatomy, innervations, action), Extra ocular muscles (anatomy, innervations, action), Orbital Blood supply	60
IV	**OCULAR ANATOMY II:** Cranial nerves: Detailed study of each of the following nerves in terms of their nuclei, course, relationship within brain, Effects of compression etc. at different regions:-Optic nerve, Oculomotor nerve, Trochlear nerve, Trigeminal nerve, Abdu cent nerve, Facial nerve Visual Pathway, Autonomic Innervations of Ocular structures.	60

V	**OCULAR PHYSIOLOGY** Protective mechanisms in the eye, Pre corneal tear film, eyelids and lacrimation, Extrinsic Ocular muscles: their actions and control of their movements. Saccadic, smooth pursuit and nystagmic eye movements, Coats of the eyeball, Corneal Physiology, Aqueous humor and vitreous: Intra ocular pressure. Iris and pupil, Crystalline lens and accommodation– Presbyopia, Retina–structure and functions, dark and Light Adaptations, Vision–general aspects of sensation, Pigments of the eye and photo chemistry, electrophysiology. The visual stimulus, refractive errors Visual acuity, vernier acuity and principle of measurement, Visual perception–Binocular vision, stereoscopic vision, optical illusions Visual pathway, central and cerebral connections, lesions of pathway and effects, Color vision and color defects. Theories and diagnostic tests.	60

SEMESTER – III

PHARMACOLOGY – I

23PHCG1001

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

Credits: Theory 01 & Practical 0.5

Hours: Theory 15 & Practical 15

Theory:

UNIT	CONTENT	No. OF HOURS
I	**General Pharmacology** Routes of drug administration. Pharmacokinetics – Absorption, Distribution, Metabolism, Excretion. Pharmacodynamics – Drug Receptor interactions, Factors modifying drug action, Adverse Drug Reaction, Pharmacovigilance.	3
II	**Autonomic Nervous system** Cholinergic and Anticholinergic drugs. Adrenergic Agonists and Antagonists. Skeletal Muscle Relaxants.	3
III	**Autacoids** Histamine and Antihistaminics. Prostaglandins and their analogues. Renin angiotensin aldosterone system.	3
IV	**Diuretics** Loop Diuretics. Thiazide diuretics. Potassium Sparing diuretics.	3

	Osmotic diuretics.	
V	**Cardio Vascular System** Anti hypertensive drugs. Anti anginal drugs. Pharmacotherapy of Myocardial infarction. **Blood** Oral and Parenteral anticoagulants. Anti platelets drugs. Fibrinolytics. Oral and Parenteral Iron preparations.	3
Practical		
I	Spotters (20)	5
II	Case based discussion (10)	10

COURSE OUTCOMES:

At the end of course, students should know about

- Pharmacokinetics and pharmacodynamic principles of drugs
- Drugs acting on autonomic nervous system
- Drugs modulating autacoids
- Drugs used in cardiovascular and hemodynamic disorders.
- Drugs acting on renal system

References:

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

MICROBIOLOGY – I

23MIBG1001

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, Pathogen city, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

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

SYLLABUS

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 15

Theory:

UNIT	CONTENT	NO. OF HOURS
I	General Bacteriology	4
	Introduction- Brief history of Microbiology	
	Microorganisms in disease and health	
	Sterilization & disinfection including Spaulding's criteria (Physical Methods and Chemical methods)	
	Sterilization of instruments	
	Cleaning and disinfection protocols	
	Morphology of bacteria	
	Physiology of bacteria	
	Sample collection and transport	
	Culture media and culture methods	
	Identification of bacteria	
II	Infections due to Gram positive cocci & Gram negative cocci	3
	Staphylococcus	
	Streptococcus	

	Neisseria meningitidis and Neisseria gonorrhea	
III	Infection due to Gram positive bacilli including anaerobes	5
	Corynebacterium diphtheria	
	Bacillus	
	Tetanus	
	Gas gangrene	
IV	Infections due to Mycobacteria	2
	Tuberculosis	
	Leprosy	
V	E.coli	16
	Klebsiella Species	
	Salmonella	
	Shigella	
	Vibrio cholera	
	Hemophilus influenza	
	Pseudomonas aeruginosa	
	Syphilis	
	Leptospirosis	
	Borrelia	
	Yersinia pestis	
	Mycoplasma	
	Chlamydiae	
	Rickettsiaceae	
	Prevention of Health care associated infections.	
	Standard precautions	
	Transmission based precautions	
Practical		
I	Use of common Laboratory equipment Incubator, Hot Air Oven, Water Bath Anaerobic Jar, Centrifuge, Autoclave, Microscope	1
II	Collection, Transportation and processing of clinical samples for Microbiological investigations.	3
	Culture Media & Culture Methods, AST	
	Identification of Bacteria	
III	Standard precautions: Hand hygiene	3
	Biomedical waste Management	
	Blood & Body fluid Management, Spill Management, Dealing with sharps, NSI, PEP	
IV	Microscopy	6
	Hanging drop	

	Simple staining	
	Gram staining	
	Acid fast staining	
V	Disinfection – Cleaning protocols (Surface disinfection) Sterilization of Equipment	2

COURSE OUTCOMES:

- Knowledge about the association of Micro-organisms in Disease and Health Requirement 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 forMicrobiological 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'sstaining, AFB staining)

References:

- Ananthanarayan and Paniker's Textbook of Microbiology – 10^{th} edition
- Textbook of Microbiology C P Baveja

PATHOLOGY – I

23PATH1021

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:

- To describe the rationale and principles of technical procedures of diagnostic laboratorytests.
- To know about basic diagnostic tests and correlate with clinical and morphologicalfeatures of diseases.
- To learn about commonly used bedside tests on blood, urine and other relevant samples.

SYLLABUS

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 15

UNIT	CONTENT	HOURS
UNIT I	Cell injury and death Cell injury - Definition, types of cell injury, Mechanisms of cell injury, cellular adaptations Pathological calcification. Cell death - Necrosis – types, morphology, Apoptosis- causes and mechanisms with morphology, Necrosis vs. Apoptosis and their pathogenesis, Gangrene	2 3
UNIT II	Inflammation & healing Definition, types and cardinal signs of inflammation. Acute inflammation – Causes, events, chemical mediators of inflammation, morphology. Chronic inflammation – Causes, examples, granulomatous inflammation, morphology, Repair	1 2
UNIT III	HEMODYNAMIC DISORDERS Hemorrhage, thrombosis, Embolism, Infarction Shock- definition, types, pathogenesis and morphology	2

UNIT IV	**NEOPLASIA** Definition, Differences between benign and malignant tumors, Terminology, nomenclature. Molecular basis of cancer – Oncogenes, Tumor suppressor genes, carcinogenesis, Invasion and metastasis. Laboratory diagnosis of cancer **INFECTIONS –** Bacterial, viral, parasitic, fungal infection – general outlines. Pathogenesis and laboratory diagnosis of Tuberculosis, Leprosy, Typhoid, HIV, Abscess, Amebiasis, malaria, candidiasis.	1 4 1 1 4
UNIT V	HEMATOLOGY RBC disorders - Definition, pathogenesis and laboratory diagnosis of Anemia – Iron Deficiency Anemia, Megaloblastic anemia, hemolytic anemia- thalassemia, sickle cell anemia, Aplastic anemia, polycythemia WBC disorders- Leucocytosis, Leukemoid reaction Platelet disorders- Thrombocytosis, Thrombocytopenia, Immune thrombocytopenic purpura, Hemophilia, Disseminated intravascular coagulation	9
Practicals (15hrs)		
	Microscopy Specimen collection and handling (blood), Peripheral smear staining Blood grouping Hemoglobin estimation Stool microscopy Common hematology and histopathological specimens and slides	1 1 2 1 2 1 7

COURSE OUTCOMES:

- 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 morphologicalfeatures of diseases.
- Perform simple bedside tests on blood, urine and other biological fluid samples.

REFERENCES:

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

COMMUNITY MEDICINE – I

23CMED1001

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

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 15

Theory:

UNIT	CONTENT	No. OF HOURS
I	**Concepts of disease:** Describe natural history of disease with diagram Determinants and dimensions of health Multifactorial causation of disease Epidemiological triad Explain concepts of prevention and modes of intervention with examples Risk factors and risk groups Ice berg phenomena of disease Screening of diseases.	8
II	**General epidemiology:** Describe various tools of measurement in epidemiology (rate, ratio, proportion) and measures of morbidity (incidence, prevalence etc). Classification of epidemiological methods and explain briefly each method	6
III	**Nutrition:** Classify foods and nutrients and describe concept of balanced diet Describe the common vitamin deficiency disorders and their preventive measures. Outline the common nutritional problems in India and their prevention –Protein Energy Malnutrition, Anaemia Describe role of nutritional factors in hypertension, diabetes, cardiovascular disorders and cancer food fortification, food adulteration ,Food safety standards &Acts	5

IV	**Occupational Health:** List out the occupational diseases Describe pneumoconiosis and preventive measures Prevention of occupational diseases Enumerate benefits under ESI act , Sickness absenteeism	4
V	**Environment and health:** Safe and wholesome water House hold purification of water Water borne diseases Chlorination of water Sanitation barrier Air pollution Radiation hazard Noise pollution **Health education & communication:** Process of communication, Types of communication ,barriers Health education-Models, principles of health education Methods of health communication.	7
Practical (15hrs)		
I	Sensitivity , specificity ,Positive predicative value ,Negative Predictive Value of a diagnostic test and interpretation	2
II	Calculation of prevalence, Incidence, mortality rates	1
III	Nutritional spotters and public health importance: Rice, wheat, pulses, Soya bean, Milk, Egg, fruits and vegetables, Iodised salt. Growth chart interpretation, BMI calculation &classification, Glycaemic	1 1
IV	Case based scenarios on occupational health diseases	3
V	Chlorination method – Horrock's apparatus Soft Skills – time management matrix, group dynamics Case- based scenarios on communication in health care	1 3 3

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.

REFERENCES:

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

23NURS1001 – Basics of Patient care & Hospital orientation : SEMESTER-III

(THEORY: 15Hr and Non-Credit)

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 well being.
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	CONTENT	HOURS
I	**Describe the principles of careof bedridden patient** - Care of a bedridden patient - Patient assessment - Assessing personal concerns of patient - Assessing physiological needs Assessing current physical status **Describe the basicprinciples 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	3
II	**Describe and demonstrate techniques to maintain patient hygiene** Patient hygiene - Cycle of infection - Body's defence against infection - Infectious diseases - Maintaining hygiene **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	3
III	**Describe and record vital data and basic clinicalparameters** 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 **Describe and demonstrate howto monitor patients** Patients monitoring Assessing personal concerns of patient - Assessing physiological needs - History taking - Physical assessment	3
IV	**Describe the principles of patient safety** - Patient transfer - Restraints and immobilization - Accidents and incident reports - Fire hazards Other common hazards **Describe and demonstrate the principles of cleaning, disinfection**	3

	and sterilization in thehospital wards/ ICU - Hand washing: simple, hand antisepsis andsurgical antisepsis (scrub) - Isolation: source and protective -Sterile packs - Surgical scrubbing - Gowning and gloving -Sterilization - Fumigation Autoclaving **Describe the common routesfor drug administration** -Assess the patient's condition - Recognize different definitions associatedwith pharmacology - Recognize various classifications of drugs - Identify the ten rights of drug administration - List out common routes and methods ofdrug administration Perform venipuncture using appropriateuniversal Precautions	
V	**Describe and perform basic procedures** -Injections, -Ryle's tube, -Foley's catheterization, -Taking blood samples, -Wound dressing **Describe and demonstrate documentation of patient related data in thecase sheet records** -History taking data sheet - Documentation: Purpose of Recording and reporting, Communication within the HealthCare Team, - Types of records; ward records, medical/nursing records, Common Record-keeping forms, Computerized documentation **Describe and demonstrate useof basic hospital equipment** Use of basic hospital equipment	3

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 oralcommunication and listening skills in interactions.

References:

1. 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.

OPTOMETRY – I

23OPTH2011

INTRODUCTION:

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

Credits: Theory 01 & Practical 11.5

Hours: Theory 15 & Practical 345

UNIT	CONTENT	No. OF HOURS
I	**Ocular microbiology & Ocular pathology :** Introduction to Microbiology :Types of Microorganisms, Physiology of Microorganisms – Nutrition, Enzymes, Metabolism and energy, Microbial Growth ,Sterilization and disinfection in the laboratory ,Control of Microbial Growth – Antimicrobial methods and Chemotherapy, Microbes versus Humans- The development of Infection, the disease process, pathogenicity and virulence General Pathology: Principles,Pathophysiology of Ocular Angiogenesis , Ocular Infections, Pathology of cornea and Conjunctiva , Pathology of Uvea, Glaucoma Retina Ocular Bacteriology-Gram positive(Staphylococcus auras, Staphylococcus epidermis, Streptococcus, propionic bacterium, actinomycesNocardia). Bacteria including acid fast bacilli,Mycobacterium tuberculosis, Myobacteriumleprae) Ocular Bacteriology-GramnegativeBacteria (pseudomonas, haemophiilus, Brucella, Neisseria, Moraxella) Pathology of retina in systemic disease/disorders,Pathology of eyelids and adnexa,Pathology of orbital space occupying lesions Spirochetes (Treponema, Leptospiraceae),Virology: Classification of Viruses in Ocular Disease, Rubella, Adenovirus, Oncogenic Viruses (HPV, HBV, EBV, Retroviruses), HIV. , Fungi : Yeasts, Filamentous, Dimorphic ,Intracellular parasites - Chlamydia, Protozoa	3

	(Taxoplasmosis, Acanthamoeba,) Helminths (Toxocariasis , Filariasis , Onchocerciasis , Trematodes)Pathology of the optic nerve , Retinoblastoma,Pathology of Lens.	
II	**VISUAL OPTICS I :** Review of Geometrical Optics space: Vergence and power ,Conjugacy , object space and image Sign convention, Spherical refracting surface, Spherical mirror; catoptric power, Cardinal points, Magnification, Light and visual function Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Bi-refringence, Dichroism , Aberration and application Spherical and Chromatic Optics of Ocular Structure: Cornea and aqueous, Crystalline lens, Vitreous, Schematic and reduced eye, Measurements of Optical Constants of the Eye: Corneal curvature and thickness, Keratometry, Curvature of the lens and ophthalmophakometry,Axial and axis of the eye Basic Aspects of Vision : Visual Acuity, Light and Dark Adaptation, Color Vision, Spatial and Temporal Resolution, Science of Measuring visual performance and application to Clinical Optometry Refractive anomalies and their causes: Etiology of refractive anomalies, Contributing variability and their ranges, Populating distributions of anomalies Optical component measurements,Growth of the eye in relation to refractive errors.	2
III	**OPTOMETRIC OPTICS –I** Introduction – Light, Mirror, Reflection, Refraction and Absorption,Prisms – Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units Sign Conventions, Fresnel's prisms, rotary prims,Lenses – Definition, units, terminology used to describe, form of lenses Vertex distance and vertex power, Effectivity calculations , Lens shape, size and types i.e. spherical, cylindrical and sphero-cylindrical. Transpositions – Simple, Toric and Spherical equivalent,Prismatic effect, centration, decent ration and Prentice rule, Prismatic effect of Plano-cylinder and sphero-cylinder lenses Spherometer& Sag formula, Edge thickness calculations, Magnification in high plus lenses, Minification in high minus lenses, Tilt induced power in spectacles, Aberration in Ophthalmic Lenses	2

IV	**CLINICAL EXAMINATION OF THE VISUAL SYSTEM :** History taking, Visual acuity estimation, Extra ocular motility, Cover teat, Alternating cover test, Hirschberg test. Modified Krimsky, Pupils Examination, Maddox Rod, van Herrick External examination of the eye. Lid Eversion, Schirmer's Test, TBUT, tear meniscus level, NITBUT (kerato meter), Color vision, Stereopsis. Confrontation test, Photo stress test. Slit lamp bio microscopy, Direct Ophthalmoscopy Digital pressure, Schiotz Tonometry, Applanation Tonometry, Gonioscop ,ROPLAS , Amsler test , Corneal Sensitivity, HVID ,Saccades and Pursuits	5
V	**Lighting and Eye:** 1. Determine the unknown candle Power of the given clear incandescent lamps of different wattage (at least three) using a Lummer-Brodhun photometer. Plot C.P. vs. wattage curve & determine the C.P. that would be due to another lamp of different watt of the same make from the curve. 2. Determine the mean horizontal candlepower of a lamp using Flicker Photometer. 3. Determine the surface luminance of the given (painted) incandescent lamp of different wattage by using L.B. Photometer & extrapolate the results to obtain the surface luminance corresponding to a lamp of different watt of the same make. 4. Calibrate the given physical photometer consisting of a photocell & a micrometer for at least five luminous intensities & three external circuit resistances. Use the calibrated photometer to determine C.P. of the given lamp. 5. Use a calibrated Luxmeter to measure the levels of illumination at least 15 working places in the college. Identify the locations & note the measured levels at each location, indicating whether the measured values agree with the prescribed values for comfortable vision. If there are considerable deviations, suggest what to do.	3
Practical		
I	**OCULAR MICROBIOLOGY PRACTICE** Slide demonstrations of various stains in pathological conditions. Visit to microbiology and pathology lab.	69
II	**OPTOMETRIC OPTICS I PRACTICE** 1. Lensomerty 2. Measurements in bifocals 3. Problem solving: i) Curvature ii) Transposition	69
III	**VISUAL OPTICS I PRACTICE**	69

	1. Introduction to visual optics 2. Properties of retinal Image i) Experiment 1: Inversion of retinal image ii) Experiment 2: Image shift with prisms iii) Demonstration 1: Point spread function 3.Illusions based on lateral inhibition i) Demonstration 2: Mach bands ii) Demonstration 3: Hermann grid Demonstration 4: Pyramidal illusion	
IV	**VISUAL OPTICS I PRACTICE** 4.Making use of the reflected light from cornea i) Experiment 3: Purkinje images ii) Experiment 4: Measurement of corneal curvature 5.Entopic phenomenon: i) Negative Afterimage ii) Demonstration iii) Experiment iv) Pupil v) Phosphorescence's vi) Purkinje Tree vii) Blue-field entopic phenomena Haidinger Brushes	69
V	**VISUAL OPTICS I PRACTICE** 6.Visual perception i) Demonstration 6: Benham's Top ii) Experiment 6: Finger Sausage trick iii) Experiment 7: Understanding about Dominant eye\ iv) Demonstration/ Activity 7: Attention v) Demonstration/ Activity 8:Persistence of Vision vi) Experiment 8:TheStroop Test vii) Experiment 9: The caloric reflex test viii) Experiment 10: Relative size 7. Visual acuity experiments i. Experiment 11: Effect of testing distance on visual acuity measured ii. Experiment 12: Measurement of Central and Peripheral visual acuity iii. Experiment 13: External illumination iv. Experiment 14: Adaptation state of the eye v. Experiment 15: Pupil size and Accommodation	69

COURSE OUT COMES:

- At the end of this course the learner will be able to
- Get familiarized with comm. Only used anesthetic drugs
- Understand the working of basic anesthesia equipment
- Perform procedures like IV cannulation and catheterization

REFERENCES:

- Lees synopsis ofanesthesia-14th edition
- Morgan and Mikhail– clinical anesthesia–6thedition
- Equipment drug sand wave for min Anesthesia–practical manual–Kumar P-2nd edition
- Anesthesia manual for operation theatre technicians–A A Ahanathapillai – 1stedition
- Short textbook of anesthesia– AjayYadav–6thedition

SEMESTER – IV

PHARMACOLOGY – II

23PHCG2001

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

Credits: Theory 01 & Practical 0.5

Hours: Theory 15 & Practical 15

Theory

UNIT	CONTENT	No. OF HOURS
I	**Central Nervous System:** General Anesthetics. Local Anesthetics. Sedative – Hypnotics. Anti Epileptic drugs. Treatment of Parkinson's disease. Opioid analgesics. Non Steroidal anti Inflammatory drugs. (NSAIDs)	3
II	**Gastro intestinal system:** Emetics and Antiemetics. Drug for Peptic Ulcer.	2
III	**Respiratory System:** Drugs for Bronchial Asthma. Drugs for Cough.	2
IV	**Hormones:** Thyroid and Antithyroid drugs. Corticosteroids. Insulin and Oral Antidiabetic drugs. Drugs acting on Uterus.	5
V	**Chemotherapy – I:** Sulfonamides. F luoroquinolones. Penicillins. Cephalosporins. **Chemotherapy – II:** Aminoglycosides. Macrolides.	3

	Tetracyclines. Chloramphenicol. Anti Viral drugs.	
Practical		
	Spotters (20)	5
	Case based discussion (10)	10

COURSE OUTCOMES:

At the end of course, students should know about

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

REFERENCES:

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

MICROBIOLOGY – II

23MIBG2001

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:

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

SYLLABUS

Credits: Theory 01 & Practical 01

Hours: Theory 15 & Practical 30

UNIT	CONTENT	HOURS
I	Immunology	3
	Antigens and antibodies	
	Antigen and antibody reactions	
	Hypersensitivity	
	Immunohematology	
	Autoimmunity	
II	Virology	3
	Virology : Introduction to viruses and lab diagnosis of viral infections	
	Common viral infections	
III	HIV	3
	Hepatitis viruses	
	Dengue virus	
	Rabies virus	
IV	Parasitology	3

	Parasitology : Definition General Characteristics of Parasite Classification of Parasite Mode of transmission	
	Entamoeba histolytica and protozoan diarrheal pathogens	
	Malarial parasites	
	Helminths	
	Cysticercosis	
V	Mycology	3
	Mycology : Common mycological infections and lab diagnosis	
	Candida	
	Superficial fungal infections	
	Systemic mycosis , Cryptococcus	
	Opportunistic mycoses	
	Infection control and prevention	
	Infection control and prevention	
	Safety in laboratory	

UNIT	CONTENT	HOURS
I	Specimen collection and Handling	2
II	Sputum examination	4
	Acid fast staining	
	Gram staining	
III	Lab diagnosis of Viral infections	8
	Serology	
	ELISA	
	ICT Test	
IV	Stool examination	4
V	Lab diagnosis of fungal infections	12
	Molecular methods for the diagnosis of infectious diseases	
	Good laboratory practices	
	Safe infusion practices	

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 andHandling
- Know about the Common fungal infections and their Specimen collection and Handling
- Knowledge about Good laboratory practices, Safe infusion practices and Safetyin laboratory
- Knowledge about the commonly performed serological tests in the diagnosis ofvarious diseases
- 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

PATHOLOGY – II

23PATH2021

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:

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

SYLLABUS

Credits: Theory 01 & Practical 01

Hours: Theory 15 & Practical 30

UNIT	CONTENT	HOURS
I	Heart & Blood vessels: Atherosclerosis, Ischemic heart disease, Pathogenesis and morphology of Myocardial Infarction, Rheumatic fever and Hypertension	2
II	Lung - Asthma, COPD, Bronchiectasis.	1
III	GIT & liver: Barrett`s esophagus, Peptic ulcer, Gastritis, Inflammatory bowel disease. Hepatitis, Alcoholic liver disease, cirrhosis Pancreatitis Splenomegaly – causes	3
IV	Kidney Kidney- Mechanisms of glomerular injury, Glomerulonephritis- Nephrotic Syndrome (Minimal change disease, Focal segmental glomerulosclerosis) Nephritic syndrome (Post streptococcal Glomerulonephritis, Membranoproliferative Glomerulonephritis, Membranous nephropathy), HIV associated nephropathy, Lupus nephritis, Diabetic nephropathy, Chronic Glomerulonephritis, Chronic kidney disease, Renal calculi, Acute tubular necrosis, Renal Tumors.	1 1 1 1 1
V	CNS – Meningitis, cerebrovascular diseases. Endocrine disorders Thyroid- Hypothyroidism, Hyperthyroidism, Goitre- Pathogenesis, diffuse and	4

	nodular goiter, morphology, Hashimoto's thyroiditis Diabetes mellitus.	
Practicals		
VI	Reception and handling of tissue specimens Urine examination Staining -Hematoxylin and Eosin, Papanicolau staining Body fluid analysis Common histopathological slides and specimens.	3 2 3 3 4

COURSE OUTCOMES:

- To impart knowledge on various common infectious diseases with its lab diagnosis andHematological malignancies.
- Make student familiar with predisposing factors, etiopathogenesis, morphology andcomplications of common diseases of kidney, lung, liver, git, heart and thyroid.
- To demonstrate few special staining techniques and body fluid analysis.
- To acquire knowledge about handling of tissue specimens, histopathology techniques,automated processors and few specimens and slides in histopathology

REFERENCES:

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

COMMUNITY MEDICINE – II

23CMED2001

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 andcommunity 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

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 15

Theory:

UNIT	CONTENT	No. OF HOURS
I	**Infectious diseases epidemiology:** Define terms- infection, contamination, infectious disease, contagious disease, communicable disease, epidemic, endemic, sporadic, pandemic, zoonotic, nosocomial, iatrogenic, eradication, control, surveillance, incubation period, isolation, quarantine. Dynamics of disease transmission in terms of chain of infection, direct &indirect transmission, mode of disease transmission. Methods of control of disease with examples	7
II	Immunization, types of vaccines, immunization schedule , cold chain Disinfection, properties of ideal disinfectant, types, examples , recommended disinfecting procedures. Disinfection and sterilization at health care centre level	3
III	Epidemiology of Communicable diseases: Tuberculosis, HIV, Tetanus, Rabies, vector borne diseases (Malaria, Dengue), food poisoning, Acute Diarrhoea, Acute Respiratory Infections Non-communicable diseases: Epidemiology, preventive measures for Hypertension, Diabetes, Cardiovascular Diseases, obesity, accidents . Epidemiology and preventive measures for common cancers	7
IV	**National Health Programs :** A) National Tuberculosis Elimination Program	5

	B) National Vector Borne Disease Control Program C) National AIDS Control Program D) Reproductive and Child Health Program , Universal Immunization Program	
V	Primary health care- definition, principles of primary health care Health care delivery system **Biomedical waste management :** Biomedical waste – Sources, hazards, categories &coding, disposal	4
	Demography and Family planning: Factors influencing population growth , Birth rate, death rate Methods of contraception –Types , mechanism of action, advantages, disadvantages, side effects Principles of medical ethics and common ethical issues, Medical negligence, Consumer Protection Act	4
Practical		
I	Hand washing technique	3
II	Vaccines, Cold chain equipment , disinfectants	3
III	Entomology spotters, case- based scenarios on communicable and non-communicable diseases	3
IV	Types of data &Bio-statistics	3
V	Biomedical waste management -spotters Family planning spotters – Oral Contraceptive pills , Condom, IUCD, Emergency contraceptive pill – 3 hrs Communication skill – Gather, ICTC-Provider initiated, Client initiated	3

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

REFERENCES:

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

OPTOMETRY - II

23OPTH2021

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

COURSE OUTCOMES:

1. Etiological classifications of various eye refractive problems of the eye with proper optical corrections
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

They will be known all pharmacological usages of the eye in various diseases

SYLLABUS

Credits: Theory 01 & Practical 12

Hours: Theory 15 & Practical 360

Theory:

UNIT	CONTENT	No. OF HOURS
I	**OCULAR DIESEASE** Orbit: Applied Anatomy, Proptosis (Classification, Causes, Investigations), Enophthalmos, Development AnomaliesCraniosynostosis craniofacialDysostosis, Hypertelorism, Median facial cleft syndrome), Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis). Grave's Ophthalmopathy, Orbitaltumors (Dermoids, capillary haemangioma, Optic nerve glioma), Orbital blowout fractures, Orbitalsurgery (Orbitotomy), Orbital tumors, Orbital trauma, Approach to a patient with proptosis Lids : Applied Anatomy, Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos),Oedema of the eyelids(Inflammatory, Solid, Passive edema) Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum), Anomalies in theposition of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis,Lagophthalmos, Blepharospasm, Ptosis). Tumors (Papillomas	3

	,Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma). Lacrimal System: Applied Anatomy ,Tear Film ,The Dry Eye (Sjogren's Syndrome), The watering eye (Etiology, clinical evaluation), Dacryocystitis , Swelling of the Lacrimal gland(acryoadenitis). Conjunctiva : Applied Anatomy, Inflammations of conjunctiva(Infective conjunctivitis – bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis),Degenerative conditions(Pinguecula, Pterygium, Concretions),Symptomatic conditions(Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration) , Cysts and Tumors.	
II	Cornea : Applied Anatomy and Physiology ,Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea) ,Inflammations of the cornea (Topographical classifications: Ulcerative). Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic, Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration) , Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy) , Keratoconus , Keratoglobus , Corneal oedema, Corneal opacity, Corneal vascularisation , Penetrating Keratoplasty Uveal Tract and Sclera : Applied Anatomy, Classification of uveitis ,Etiology , Pathology ,Anterior Uveitis, Posterior Uveitis, Purulent Uveitis ,Endophthalmitis, Panophthalmitis, Pars Planitis,Tumors of uveal tract(Melanoma),Episcleritis and scleritis, Clinical examination of Uveitis and Scleritis	5
III	**VISUAL OPTICS II** Refractive conditions: Emmetropia, Myopia, Hyperopia, Astigmatism, Accommodation ,Presbyopia , Anisometropia and Aniseikonia, Aphakia and Pseudophakia Accommodation :Far and near points of accommodation , Correction of spherical ametropia , Axial versus refractive ametropia, Relationship between accommodation and convergence, AC / A ratio Objective refraction : Streak Retinoscopy only Subjective Refraction : Review of subjective refractive methods, Cross cylinder methods for astigmatism, Astigmatic Fan Test, Difficulties in subjective and objective tests and their avoidance , Ocular refraction versus spectacle refraction. Subjective Refraction: Ocular accommodation versus spectacle accommodation Spectacle magnification and relative spectacle magnification, Retinal image blur; depth of focus and depth of field, Prescribing Prisms / Binocular Refraction	4
IV	**VISUAL OPTICS II** Raw materials – History and General Outline, Manufacturing of Ophthalmic Blanks – Glass & Plastics, Terminology used in Lens Workshops, Surfacing process from Blanks to lenses. Definition: Materials (Glass, Plastics, Polycarbonate, Triology) types and Characteristics , Properties (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, abbe value, Center thickness) ,Best form of lenses & Safety standards for Ophthalmic lenses (FDA, ANSI, ISI, Others) ,Design of High Powered Lenses	1

V	Hi-index lenses, Calculation of Refractive index, Bifocal designs, their manufacturing & uses (Kryptok ,Univis D, Executive, Invisible, Occupational). Progressive Addition Lenses, modified near vision lenses (designs, advantages, limitations) ,Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection coating, UV coating, Hydrophobic coating, anti-static coating a. Lens defects – Description and Detection b. Glazing & edging (manual & automatic) c. Special lenses d. Lenticulars e. Aspherics f . Fresnel lenses & Prisms g. Aniseikonic lenses h. Photochromic i. Polaroid's j. Tinted lenses – Tints, filters Project to ensure awareness on lens availability in Indian market, History of Spectacles, manufacturing overview, Definition, parts & measurements Classification of frames – Materials (cover in detail), Colors and Temple position (advantages & disadvantages, where to use), Special purpose frames (sports, kids, reading)	2
Practical		
I	**OCULAR DISEASE LAB** 1. History of the ophthalmic subject. 1.1 Ocular symptoms 1.2 The past prescription and its influence 2. Visual acuity testing- distance and near, and color vision. 2.1. Examination of muscle balance& eye motility 2.3. Objective refraction 3. Slit lamp examination 3.1. Examination of eye lids, conjunctiva, sclera 3.2. Examination of cornea 3.3. Examination of iris, ciliary body, and pupil 3.4. Examination of lens. 3.5. Slit lamp photography.	120
II	4. Examination of intraocular pressure and examination of angle of anterior Chamber. (Gonioscopy) 5. Ophthalmoscopy- indirect and direct. 6. Examination of fundus (vitreous and disc), (choroid and retina) 7. Examination of the lacrimal system & lacrimal function tests 8. Examination of the orbit 10. Macular function test 11. Visual field charting (central)&(peripheral) & Interpretation of Humphrey Visual field 12. Neuro-ophthalmological examination. 13. Color perception & color vision. 14. Diplopia charting 15. Electro diagnostic procedures. 16. Cases work – up 17. Radiology. 18. Removal of foreign body	40
III	**Clinical Optometry-II** 1. Photometry 2. Practice of Retinoscopy – Emmetropia 3. Practice of Retinoscopy - Spherical Ammetropia 4. Practice of Retinoscopy - Simple Astigmatism 5. Practice of Retinoscopy – Compound hyperopia 6. Practice of Retinoscopy – Compound Myopia 7. Practice of Retinoscopy – in media opacities 8. Practice of Retinoscopy – Oblique Astigmatism. 9. Practice of Retinoscopy – in irregular astigmatism	40

IV	**Practice of Retinoscopy – Strabismus and Eccentric fixation** 10. Myopia and Pseudo myopia myopia and visual acuity 11. Myopic correction - subjective verification Monocular and Binocular. 12. Hypermetropia : Determination or manifest error subjectively 13. Hypermetropic correction : subjective verification 14. Demonstration of astigmatism. Use of Slit and Keratometry to find the principal meridians. 15. Astigmatism: Subjective verification. Fan subjective verification test 16. Astigmatism: Cross Cyl.- subjective verification tests. 17. Measurement of accommodation: Near and far points and range. 18. Presbyopia correction and methods : Accommodative , reserve, balancing the relative accommodation and Cross Grid test 19. Methods of differentiating axial and refractive ametropia 20. Interpretation of CycloplegicRetinoscopic findings Prescription writing 21. Binocular refraction 22. Vision therapy 23. Exercises for vergence	40
V	**<u>OPTOMETRIC OPTICS II PRACTICE</u>** 1.Lensometry 2.Measurements in multi focal lenses 3.Problem solving- Prismatic effects **<u>OCULAR DIESEASES I PRACTICE LAB</u>** 1. Slide demonstration of Ocular Conditions 2. Case Analysis **<u>OCULAR DIESEASE II PRACTICE LAB</u>** 1. Slide demonstration of Ocular Conditions 2. Case Analysis	120

SEMESTER – V

OCULAR DISEASES – II & OCULAR PHARMACOLOGY

23OPTH3001

SYLLABUS

Credits: Theory 01 & Practical 01

Hours: Theory 15 & Practical 30

Theory

UNIT	CONTENT	THEORY HOURS
I	**Ocular Diseases** Congenital and Developmental Disorders, Optic Disc: Coloboma , Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloids Artery) ,Inflammatory disorders Lens: Applied Anatomy and Physiology, Clinical examination, Classification of cataract , Congenital and Developmental cataract ,Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, radiational, Toxic), Morphological: Capsular, Sub capsular, Cortical, Supra nuclear, Nuclear, Polar, Management of cataract (Non-surgical and surgical measures; preoperative evaluation, Types of surgeries,), Complications of cataract surgery Displacement of lens: Subluxation, Displacement, Lenscoloboma, Lenticonus, Micro sperophakia. Clinical Neuro-ophthalmology: Anatomy of visual pathway, Lesions of the visual pathway, Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus Gunn pupil. Argyll Robertson pupil, Adie's tonic pupil), Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy	**4**
II	(Retinitis : Acute purulent , Bacterial, Virus, mycotic) ,Retinal Vacuities (Eales's),Retinal Artery Occlusion (Central retinal Artery occlusion) , Retinal Vein occlusion (Ischemic, Non Ischemic , Branch retinal vein occlusion) Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations, Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration, Retinal Detachment: Rhegmatogenous, Tractional, Exudative) , Retinoblastoma	**4**
III	Ocular Injuries: Terminology : Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury) ,Mechanical injuries (Extra ocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis), Non Mechanical	**2**

	Injuries (Chemical injuries, Thermal, Electrical, Radiational), Clinical approach towards ocular injury patients	
IV	Clinical Neuro-ophthalmology : Cortical blindness, Malingering, Nystagmus ,Clinical examination, Glaucoma : Applied anatomy and physiology of anterior segment, Clinical Examination, Definition and classification of glaucoma, Pathogenesis of glaucomatous ocular damage ,Congenital glaucoma ,Primary open angle glaucoma ,Ocular hypertension , Normal Tension Glaucoma , Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) , Secondary Glaucoma, Management : common medications, laser intervention and surgical technique	**2**
V	**BASIC & OCULAR PHARMACOLOGY** Pharmacokinetics: Drug absorption, distribution, metabolism and excretion Pharmacodynamics : Drug Handling by the body – effect of drug and the relationship between drug concentration and response, Drug – Receptor interactions Ocular Pharmacology : Drug Handling by cells and Tissues – Pharmacokinetics, and Pharmacodynamics– specific to ocular – surface and intraocular conditions	**1**
	Delivery methods of Ocular Medication: Residence in the conjunctival sac, drug vehicles affect drug delivery, advanced ocular delivery systems Reconstituting the tear film: Tear Substitutes, Ocular Drugs and the Autonomic Nervous system: Parasympathetic(anti muscaranic) and Sympathetic Intraocular pressure Drugs, Eicosanoids: prostaglandins, thromboxaes and leukotrienes. Serotonin : Neurotransmitter; Glucocorticoids, Immunosuppressive agents, Local Anesthetics , Ocular Toxicity from systemic administration of Drugs supervised setting	**2**

Practical:

UNIT	CONTENT	THEORY HOURS
I	**Ocular Diseases** Lens	4
	Optic Disc	2
II	Retina	4
	Vitreous	4
III	Macular disorders	8
IV	Ocular Injuries	4
V	Clinical Neuro-ophthalmology by using various diagnostic instruments	4

CONTACT LENSES

23OPTH3011
SYLLABUS

Credits: Theory 01 & Practical 01

Hours: Theory 15 & Practical 30

Theory		
UNIT	**CONTENT**	**HOURS**
I	Introduction to contact lenses: Definition, Classification/ Types, History of Contact Lenses, Optics of Contact Lenses. Review of Anatomy & physiology of Tear film, Cornea, Lids & conjunctiva. Introduction to CL materials and Properties of CL materials	4
II	Physiological (DK, lonicity, Water content)Physical (Elasticity, Tensile strength, Rigidity), Optical (Transmission, Refractive index), Indications and Contraindications, Parameters/ Designs of Contact Lenses & Terminology, RGP contact Lens materials, Manufacturing Rigid and Soft Contact Lenses- various methods, Pre-fitting examination	3
III	Correction of Astigmatism with RGP lens: Types of fit- Steep, Flat , Optimum- on spherical cornea with spherical lenses, Types of fit- Steep, Flat , Optimum- on Toric cornea with spherical lenses, Calculation and finalising Contact lens parameters, Ordering of contact Lenses- writing a prescription, Checking and verifying Contact lenses, Common Handling Instructions, Insertion & Removal Techniques and Do's and Don'ts.	1
IV	Care and Maintenance : Cleaning agents & Importance, Rinsing agents & Importance, Disinfecting agents & importance, Lubricating & Enzymatic cleaners and Follow up visit examine	3
V	SCL Materials & Review of manufacturing techniques: Comparison of RGP vs. SCL, Pre-fitting considerations for SCL, Fitting philosophies for SCL, Fit assessment in Soft Contact Lenses: Types of fit-Steep, Flat, Optimum, Disposable lenses, Advantages and availability, Soft Toric CL and Stabilization techniques	4

Practical		
I	**CONTACT LENSES LABORATORY** Routine clinical Procedure for contact lens & selection of contact lens. Slit lamp examination of contact lenses wearers.	5
II	Insertion & removal of soft & RGP contact lenses. Contact lens handling, cleaning & maintenance	5
III	Fitting and assessment of contact lenses-steep, flat, Teaching the patient to insert and remove contact lenses.	5
IV	Writing contact lens prescriptions.,Examination of old soft lenses.	5
V	Special RGP fitting(Aphakia, pseudophakia and keratoconus)	5
	Fitting cosmetic contact lenses	5

OPTOMETRY - III
23OPTH3021
SYLLABUS
Credits: Theory 03 & Practical 06
Hours: Theory 45 & Practical 180

Theory:

UNIT	CONTENT	HOURS
I	**LOW VISION AIDS** Definitions & classification of Low vision, Epidemiology of low vision, Model of low vision service. Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision	12
II	Types of low vision aids – optical aids, non-optical aids & electronic devices, Optics of low vision aids.	5
III	Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training. Pediatric Low Vision Low vision aids – dispensing & prescribing aspects Visual rehabilitation & counselling. Legal aspects of Low vision in India	10
IV	**Research Methodology & Biostatistics** 1. Introduction to research methods 2. Identifying research problem 3. Ethical issues in research 4. Research design 5. Basic Concepts of Biostatistics 6. Types of Data 7. Research tools and Data collection methods 8. Sampling methods 9. Developing a research proposal andPrincipals of management	10
V	**Organizational Behaviour** Introduction to Organization Behavior Introduction to organization, organization and managers, manager' roles and skills, behavior at work, introduction to organization behavior, major behavioral science disciplines contributing to OB, challenges and opportunities managers have in applying OB concepts, OB model (including motivation models) and levels of OB model Individual behavior Introduction to individual behavior, values, attitudes, job satisfaction, personality, perception and individual decision making, learning, motivation at work, managing emotions and stress (Meaning-Definition Stress and job performance relationship Approaches to stress management (Coping with stress) Interpersonal behavior Interpersonal Behavior, Johari Window, Transactional Analysis – ego states, types of transactions, life positions, applications of T.A., managerial interpersonal style Organizational behavior Foundations of organization structure, organization design, organization culture, organization change, managing across cultures, human resource management policies and practices, diversity at work.	8

OPTOMETRY - IV

23OPTH3031

SYLLABUS

Credits: Theory 03 & Practical 06

Hours: Theory 45 & Practical 180

Theory:

UNIT	CONTENT	HOURS
I	**BINOCULAR VISION & SQUINT** **Grades of binocular vision**-simultaneous perception (first grade of binocular vision), fusion,steropsis (third grade of binocular single vision). Advantages of binocular vision.Visual direction and the horopter_visual direction, corresponding point and normal retinal correspondence, horopter, physiologic diplopia. Binocular fusion-panum'sarea,fixationdisparity,theories of binocular fusion, synergy hypothesis of panum, local sign hypothesis of hering, eye movement hypothesis of helmholts, supression hypothesis of du tour and verhoeff, physiologic basis of fusion.	10
II	**Dihoptic stimulation**-depth with fusion and depth with diplopia, diplopia without depth, retinal rivary and suppretion, binocularlusure. Stropsis-physiological basis of stereopsis, local and global stereopsis and fusion, stereopsis acuity neurophysiology of stereopsis. Depth perception-steropsis, nonstereoscopiccluestoyhe perception of depth under binocular condition, monocular clues (non stereoscopic clues to spatial orientation)-parallactic movements, linear perspective overiay of contours, size distance from horizon ,distribution of highlights, shadow, shades and light .aerial perspective ,influence of accommodation and convergence on depth perception, conclusion. Integration of the motor and sensory system into binocular vision	10
III	**Binocular defects**: Binocular optical defects-anisometropia-vision in anisometropia, treatment, Binocular optical defects-aniseikonia symptoms, clinical investigation, treatment. Binocular muscular co-ordination- orthophoria. Binocular muscular anomalies- heterophoria, exophoria, esophoria, hyperphoria, cyclophoria, esotropia, exotropia, Binocular muscular anomalies-anomalies of convergence and other reading difficulties—insufficiency of convergence, convergence excess, the ophthalmologist and the reading ability of children	10
IV	Neurogenic palsies- Etiology of cranial nerve palsy, Diagnosis, characteristic, management of III nerve palsy, Etiology of IV nerve palsy, Diagnosis, characteristic, managements. Etiology of VI nerve palsy, Diagnosis, characteristic, management	5
V	Mechanical palsies – Duane's retraction syndrome, Browns syndrome, General fibrosis syndrome, Blow out fractures, Thyroid eye diseases, Anomalies of binocular vision in congenital syndrome- Downs syndrome, cerebral palsy craniofacial anomalies. Amblyopia	10
Practical:		
I	**SQUINT LABORATORY** 1. Demonstration of following Orthoptic instruments/methods and their uses 2. Prism Bar 3. Maddox Rod -Red Green Goggles	40
II	1. RAF Gauge 2. Cover test 3. Hirschberg test 4. Krimsky test	40
III	1. Accommodative flipper 2. Orthoptic Investigative & Therapeutic Procedure. 3. Case records. Case Handling	40
IV	**LOW VISION** Low Vision Aids & Visual Rehabilitation Lab	120
V	Case history/ Assessment ,LV. Application of devices/Visual Rehabilitation.	120

SEMESTER – VI

OPTOMETRY - V

23OPTH3041

SYLLABUS

Credits: Theory 04 & Practical 04

Hours: Theory 60 & Practical 120

Theory:

UNIT	CONTENT	HOURS
I	**OCCUPATIONAL OPTOMETRY** Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. Acts and Rules - Factories Act, WCA, ESI Act. Electromagnetic Radiation and its effects on Eye Light – Definitions and units, Sources, advantages and disadvantages, standards. Colour – Definition, Colour theory, colour coding, colour defects, colour Vision tests. Occupational hazards and preventive/protective methods and Task Analysis Industrial Vision Screening – Modified clinical method and Industrial Vision test. Vision Standards – Railways, Roadways, Airlines. Visual Display Units. Contact lens and work.	15
II	**PAEDIATRIC** Structural, and morphological changes of eye in elderly, Physiological changes in eye in the course of aging. Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD).	15
III	Optometric Examination of the Older Adult. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye. Contact lenses in elderly. Pharmacological aspects of aging. Low vision causes, management and rehabilitation in geriatrics. Spectacle dispensing in elderly – Considerations of spectacle lenses and frames.	15
IV	The Development of Eye and Vision. History taking Paediatric subjects. Assessment of visual acuity. Normal appearance, pathology and structural anomalies of Orbit, Eye lids, lacrimal system. Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil. Lens, vitreous, Fundus Oculomotor system. Refractive Examination. Determining binocular status. Determining sensory motor adaptability.	8
V	Compensatory treatment and remedial therapy for: Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia. Remedial and Compensatory treatment of Strabismus and Nystagmus. Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics. Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism. Spectacle dispensing for children. Paediatric contact lens. Low vision assessment in	7

OPTOMETRY - VI

23OPTH3051

SYLLABUS

Credits: Theory 04 & Practical 04

Hours: Theory 60 & Practical 120

Theory:

UNIT	CONTENT	HOURS
I	**Geriatric Optometry :** Structural, and morphological changes of eye in elderly, Physiological changes in eye in the course of aging. Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD).	15
II	Optometric Examination of the Older Adult. Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye. Contact lenses in elderly. Pharmacological aspects of aging. Low vision causes, management and rehabilitation in geriatrics. Spectacle dispensing in elderly – Considerations of spectacle lenses and frames	10
III	**SYSTEMIC DISEASES** Hypertension: Definition, classification, Epidemiology, Clinical examination, Complications, and management. Hypertensive retinopathy, Diabetes Mellitus, Classification, Pathophysiology, Clinical presentations, Diagnosis, and Managerrient, Complications. Diabetic Retinopathy, thyroid Disease Physiology, Testing for thyroid disease, Hyperthyroidism, Thyroidi, Thyroid tumors. Grave's Ophthalmopathy, Acquired Heart Disease, Ischemic Heart Disease, Congestive heart Failure, Disorders of cardiac rhythm, Ophthalmic considerations, Cancer, Incidence, Etiology, Therapy, Ophthalmologic consideration	10
IV	Connective Tissue Disease, Rheumatic arthritis, Systemic lupus erythematosus, Scleroderma, Polymyositis and dermatomyositis, Sjogren syndrome, Beheet's syndrome, Eye and connective tissue disease, Tuberculosis, Aetiology, Pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, Treatment of tuberculosis. Nutritional and Metabolic Disorders: Obesity, Hyperlipidaemias, Kwashiorkor, Vitamin (A, D, E, K, B1, B2) deficiency. Myasthenia Gravis	10
V	Herpes virus(Herpes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus), Herpes and the eye. Hepatitis (Hepatitis A,B,C), Acquired Immunodeficiency syndrome. Anemia(Diagnosis, Clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations). Common Tropical Medical Ailments: Malaria, Typhoid, Dengue, Filariases, Onchocerciasis Cysticercosis, Leprosy	15

OPTOMETRY - VII

23OPTH3061

SYLLABUS

Credits: Theory 04 & Practical 04

Hours: Theory 60 & Practical 120

UNIT	CONTENT	HOURS
I	**COMMUNITY OPTOMETRY:** Public Health Optometry: Concepts and implementation, Stages of diseases, Levels of disease prevention and levels of health care patterns, Epidemiology of blindness – Defining blindness and visual impairment. Eye in primary health care, Contrasting between Clinical and community health programs, Community Eye Care Programs, Community based rehabilitation programs, Nutritional Blindness with reference to Vitamin A deficiency. Vision 2020: The Right to Sight	15
II	Screening for eye diseases, National and International health agencies, NPCB. Role of an optometrist in Public Health. Organization and Management of Eye Care Programs. Service Delivery model: Health manpower and planning & Health Economics, Evaluation and assessment of health programmes, Optometrists role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.	15
III	**DISPENSING OPTOMETRY** Components of spectacle prescription & transposition, Add and near power relation. Frame selection –based on spectacle prescription, professional requirements, age group,face shape. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height. Lens & Frame markings, Pupillarycenters, bifocal heights, Progressive markings. Recording and ordering of lenses (power, add, diamete, material type, lens enhancements).	15
IV	Neutralization –Hand &lensometer, axis marking, Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction). Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit. Spectacle repairs –tools, methods, soldering, riveting, frame adjustments Special types of spectacle frame: Industrial safety glasses and Welding glasses. Frame availability in Indian market.	8
V	**MEDICAL LAW AND ETHICS:** Medical ethics - Definition - Goal – Scope, Introduction to Code of conduct. Basic principles of medical ethics – Confidentiality Malpractice and negligence - Rational and irrational drug therapy, Autonomy and informed consent Right of patients, Care of the terminally ill- Euthanasia. Organ transplantation Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication. Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects. Professional Indemnity insurance policy. Development of standardized protocol to avoid near miss or sentinel events. Obtaining an informed consent	7
Practical		
I	**PAEDIATRIC OPTOMETRY LABORATORY**	100

	1. Assessment of children Vision & Pediatric evaluation, diagnosis & management. 2. Strabismus & Amblyopia. 3. Neuro- Optometric Rehabilitation. 4. Evaluation, Diagnosis & Optometric management of children with mental retardation C.P. Dyslexia, 5. Multiple Sensory Motor Handicap. 6. Visual Disorders in senior citizens, evaluation, diagnosis management. 7. Refraction in special cases 8. Congenital cataract, glaucoma. 9. Pediatric and Geriatric low vision. 10. Patient with anisometropia 11. History taking of Pediatric and Geriatric patients.	
II	**GERIATRIC OPTOMETRY** History taking of Geriatric patients Visual Disorders in senior citizens, evaluation, diagnosis management. Refraction in special cases Geriatric low vision Geriatri Patient with anisometropia	20
III	**OPTOMETRIC INSTRUMENTS LABORATORY** 1. Visual Acuity chart/drum 2. Retinoscope 3. Trail Box 4. Direct ophthalmoscope 5. Slit lamp Biomicroscope 6. Ophthalmoscopy	90
IV	7. Tonometer: Schiotz Tonometer 8. Keratometer 9. Perimeter 10. Electrodiagnostic instrument (ERG, VEP, EOG) 11. A –Scan Ultrasound 12. Lensometer 13.Colour vision	90
V	**OPHTHALMIC LENS & DISPENSNG OPTOMETRYLABORATORY** 1. Find out the meridian & optical center of ophthalmic lens 2. Neutralization – manual & help of lensometer 3. Identification of lens-spherical, cylindrical &sphero-cylindrical lenses 4. Lens-surfacing & edging, cutting & marking of single vision bifocal progressive 5. Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens 6. position, segment specification 7. Frame selection: Fashion, function & standard alignment 8. Lens selection: Ground rule for selection, selection criteria. 9. Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler. 10. Common difficulties in measuring P.D, Measuring monocular P.D, measuring near C.D. 11. Measuring heights :- single vision , bifocal, multifocal, progressive 12. Pediatric dispensing	60