

FACULTY OF ALLIED HEALTH SCIENCE

B. OPTOM (BACHELOR OF OPTOMETRY)

Regulations, Curriculum and Syllabus

2020



C. B. Palaminde

REGISTRAR Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE (Deemed to be University) Periyar E.V.R. High Road, Maduravoyal, Chennai 600 095

Regulations for B.Sc. (Allied Health Science) Courses

Introduction:

B.Sc. (Allied Health Science), a (3-year course work + 1-year internship) program under the **Faculty of Allied Health Sciences**, is aimed at training students who will be able to meticulously assist the doctors for providing quality patient care in selected areas of clinical specialty. This program is a taught course that covers relevant topics and specialized areas of knowledge as opted. The aim of this B.Sc. program is to provide a thorough training to the candidates through formal lectures and/or seminars and practical programs which culminate in a one year internship that finally prepares the student for the rigors of the medical world.

1. Short Title and Commencement:

These Regulations shall be called the "Regulations for B.Sc. (Allied Health Science) Course" of Dr. M.G.R Educational and Research Institute. These regulations shall come into force from the academic year 2020-2021. These regulations are subject to modifications as may be approved by the Academic Council from time to time.

2. Eligibility for Admission:

a) A candidate desiring to join the (3-year course work + 1-year internship) program, leading to the degree B.Sc. (Allied Health Science) should have passed the HSC/CBSE/ISC or equivalent examination with one of the following subject combinations:

- i) Physics, Chemistry, Biology
- ii) Physics, Chemistry, Botany and Zoology
- iii) Physics, Chemistry and Mathematics

b) A candidate shall, at the time of admission submit to the Head of the Institution, a certificate of medical fitness from an authorized Medical Officer certifying that the candidate is physically fit to undergo the academic course and does not suffer from any disability or contagious disease.

3. Age limit for admission

A candidate should have completed the age of 17 years or would complete the age as on 31stDecember of the year of admission to the BSc .Allied Health Science Course.

4. Eligibility Certificate

Candidates, who have passed any qualifying examination other than the Higher Secondary Course examination conducted by the Government of Tamil Nadu, shall obtain an Eligibility Certificate from Dr. M.G.R Educational and Research Institute and produce the same at the time of admission.

5. Registration

A candidate admitted to the course shall register his/her name with the University by submitting the application form for registration, duly filled in along with the prescribed fee, through the Head of the Institution within the stipulated date.

6. Duration of the course

The duration of the B.Sc. (Allied Health Science) Degree Course shall be 3-year course work comprising of 6(six) semesters and one year (semesters 7 & 8) of compulsory internship. The candidate is required to pursue the course on a full time basis, and must complete the course within seven years from the date of provisional registration.

7. Commencement of the Course:

The course shall ordinarily commence by the month of August of the academic year.

8. Curriculum:

The Curriculum and syllabus for the course shall be as specified in the annexure to these regulations which are subject to modifications by the standing Academic Board from time to time.

(i) The first three years of the course will be utilized as follows:

- The first two semesters will be spent on Pre and Para clinical subjects including Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Physics, English and Communication skills, Introduction to Computers, and Pharmacology.

- At the beginning of the third semester, students will be assigned to one of the following branches of specialization as per the admission policy, and they will be offered specialized training in that specialty during the third, fourth, fifth and sixth semesters.

(ii) The fourth year of the course shall be compulsory internship in the respective specialty.

9. Medium of Instruction:

English shall be the medium of instruction for all the subjects of study and for the examination.

10. Working Days:

Each semester shall consist of not less than 100 working days and each academic year shall have a total of 200 working days or above in the first to Sixth Semesters. In the Seventh and Eighth semesters, each semester shall have a minimum of 120working days.

11. Attendance:

The candidate shall have not less than 80 % attendance in Theory and Practical separately. Each semester shall be taken as a unit for the purpose of calculating the attendance. The candidate lacking attendance in a subject shall be denied permission to appear for the University Examination in that subject.

12. Condonation of Lack of Attendance:

The discretionary power of condonation of shortage of attendance to appear for University Examination rests with the University.

Lack of attendance can be condoned up to a maximum of 10% of the minimum attendance required in the following exceptional circumstances:

- a) Any illness/ accident (for which Medical certificate from a registered medical practitioner must be produced)
 - b)Any unforeseen tragedy in the family (should produce the letter from the parent/guardian)
 c)Participation in NCC/NSS and other co-curricular activities representing the Institution / University. (Certificate from competent authority is required)

For any of the above reasons, request shall be made by the candidate with prescribed fees to the Controller of Examination through proper channel, ten days prior to the commencement of the theory examination.

13. Commencement of the examinations

There shall be two sessions of University examinations in an academic year, viz., February and August.

14. Continuous (Internal) Assessment:

Continuous (Internal) Assessment for Theory shall be the average of the best two out of three.

Continuous (Internal) Assessment for Practical shall be the average of the best two out of three.

15. Semester - End Examination (University/Department):

a. The examination in B.Sc. (Allied Health Science) shall consist of Written Theory examinations and Practical examinations. The Semester - End Examination (University/Department) shall be conducted at the end of each semester.

b. Papers for which Internal Examination is recommended by the Board of Studies and approved by the Academic Council, thedate of Semester - End Examinations (Internal examinations) shall be as per the University guidelines.

16. Pattern of Semester - End Examination (University/Department):

EXAMINATION PATTERN Semester-I and Semester-II (FOR ALL SPECIALITIES)

THEORY

Max.Marks- 60 Marks

Duration $-2^{1}/2$ Hours

PART –A (Answer any one from Two)

1. Essay (1x15=15 Marks)

PART-B (Answer all questions)

1. Short Notes (5x5=25 Marks)

PART-C (Answer all questions)

1. Short answers (10x2=20 Marks)

PRACTICAL & VIVA VOICE

Practical (including Orals) 15 Marks

CONTINUOUS (INTERNAL) ASSESSMENT

(i) Theory 20 Marks

(ii)	Practical	5 Marks	
	TOTAL - 1	100 Marks	
SEMESTEI	R III – SEMI	ESTER VI (FOR AI	LL SPECIALITIES)
		THEORY	Max.Marks - 80 Marks
			Duration - 3 Hours
Section –A (Answer	any TWO fr	om THREE)	
1. Essay	(2x1	5=30)	
Section-B (Answer a	ny EIGHT f	rom TEN)	
1. Short notes	(8x5	5=40)	
Section-C			
1.Very short notes	(5x2	=10)	
Internal assessment			20 marks
• Based on CAT E	xams		
TOTAL		PRACTICAL	100 Marks
<u>Max marks:80</u>		INACTICAL	
1. Spotters			20 marks
2. Viva (Theory & P	Practicals)		20 marks
3. Charts/stations			20 marks
. Record			20 marks
		Internal assessm	<u>eent</u>
			Max marks:20
• Based on CAT Ex	kams		
Attendance			
• Log book			
TOTAL			100 Marks

17. Marks Qualifying for a Pass:

For passing the University/End-Semester Examination from Semester I to Semester VI, the candidate shall secure the marks as stated below,

- (i) 40% minimum in the University End-Semester Theory examination
- (ii) 40% minimum in the University End-Semester Practical examination
- (iii) 40% of marks in the subject where internal evaluation alone is conducted
- (iv) 40% of aggregate of theory, practical and internal assessment taken together

18. Classification of successful candidates:

a) Successful candidates who secure 75% marks and above as a course aggregate in the first appearance taking University theory, practical, and project/dissertation evaluation shall alone be awarded Distinction. This will also apply for award of University rank.

b) Successful candidates who secure 60% marks and above as a course aggregate in the University theory, practical, project/dissertation evaluation and viva shall be awarded First Class.

c) All others who secure 40-59% in gross percentage will be classified to have passed in Second Class.

19. Revaluation of answer papers

There shall be revaluation and retotaling of answer papers of failed candidates. Failed candidates are however, permitted to apply to the University within fifteen days of publication of the results for revaluation and retotaling.

20. Carry- over of failed subjects

1) A candidate has to pass in theory and practical examinations separately in each of the paper.

2) If the candidate fails either in theory or practical examinations, he/she has to reappear for both (theory and practical)

3) The student shall start the Internship training (VII & VIII semester) only after he/she clears all the papers from Semester I to Semester VI.

21. Temporary break of study

a) A candidate is not normally permitted to temporarily break the study.

b) If a candidate is continuously absent from the institute for four or more weeks,

i) Having notified the Dean/Director/Principal within this period, this absence shall be treated as "Temporary Break of Study".

ii) Without notifying the Dean/Director/Principal, his/her name will be removed from the institute rolls.

c) If a candidate is compelled to temporarily break the study for valid reasons (such as accident or hospitalization due to prolonged ill health), he/she shall apply for condonation of the break to the Dean/Director/Principal through the Head of the Department.

d) For condonable break of study:

i) If the lack of attendance is within condonable limits as per Clause No. 12, the candidate shall be permitted to write the examination for the current semester.

ii) If there is non-condonable lack of attendance, the candidate shall rejoin the program at the respective semester as and when it is offered after the break and shall be governed by the rules and regulations in force at the time of rejoining.

e) The total period for completion of the program reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in Clause No.6 irrespective of the period of break of study in order that he/she may be qualified for the award of the degree.

f) In any case, a candidate shall be permitted to temporarily break the study only once during the entire duration of the program. The candidate shall forfeit the registration in case of a second break or in case of a non-condonable break ofstudy.

g) Without prejudice to the above rules, the candidate who has completed the attendance requirement for a semester, but has proceeded on a condonable break of study without appearing for the University Examination, shall be permitted to appear for the examinations without repeating the semester and thereafter continue the subsequent semester.

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Dr. M. G. R. EDUCATIONAL AND RESEARCH INSTITUTE (Deemed to be University) FACULTY OF ALLIED HEALTH SCIENCES SCHEME OF EXAMINATION SEMESTER – I

(B.OPTOM)

TOTAL HOURS : 330

		Hours/	Semester	Evaluation (Marks)						
S.no	PAPER	Theory	Practical	Con Assessmen	tinuous nt (Internals)	End Semest (University/De	er examination epartment Exams)	Total		
				Theory	Practical	Theory	Practical			
1	Anatomy –I(UE)	40 hours	20 hours	20	5	60	15	100		
2	Physiology -I(UE)	40 hours	20 hours	20	5	60	15	100		
3	Biochemistry -I(UE)	40 hours	20 hours	20	5	60	15	100		
4	Microbiology -I(UE)	40 hours	20 hours	20	5	60	15	100		
5	Pathology -I(UE)	40 hours	20 hours	20	5	60	15	100		
6	English(IE)	30 hours	-	-	-	50	-	50		

UE University Exam

SCHEME OF EXAMNINATION SEMESTER – II (B.OPTOM)

TOTAL HOURS: 420

			Hours / Semester		Evaluation (Marks)						
S.no	PAPER	Theory	Practical	Con Assessmer	tinuous nt (Internals)	End Semest (University/De	Total				
			-	Theory	Practical	Theory	Practical				
1	Anatomy –II(UE)	40 hours	20 hours	20	5	60	15	100			
2	Physiology -II(UE)	40 hours	20 hours	20	5	60	15	100			
3	Biochemistry -II(UE)	40 hours	20 hours	20	5	60	15	100			
4	Microbiology -II(UE)	40 hours	20 hours	20	5	60	15	100			
5	Pathology -II(UE)	40 hours	20 hours	20	5	60	15	100			
6	Pharmacology(UE)	40 hours	20 hours	20	5	60	15	100			
7	Physics(IE)	30 hours	-	_	-	50	-	50			
8	Computer Science(IE)	30 hours	-	-	-	50	-	50			

UE University Exams

SCHEME OF EXAMNINATION SEMESTER – III (B.OPTOM)

Total Hours: 420

	10 PAPER		Hours / Semester		Evaluation (Marks)					
S.no			Practical	Con s asse (Int	tinuou ssment ernals)	End Sem Examination (\ Department	ester University/ Exams)	Total		
				Theory	Practical	Theory	Practical			
1.	Ocular Anatomy and Ocular Physiology(Theory) (UE)	60 hours	-	20	-	80	-	100		
2.	Ocular Anatomy and Ocular Physiology (Practicals) (UE)	-	100 hours	-	20	-	80	100		
3.	Geometrical Optics and Physical Optics (Theory) (UE)	60 hours	-	20	-	80	-	100		
4.	Geometrical Optics and Physical Optics (Practicals) (UE)	-	110 hours	-	20	-	80	100		
5.	Medical Ethics and Bio safety(IE)	30 hours	-	-	-	50	-	50		
6.	Psychology (IE)	30 hours	-	-	-	50	-	50		
7.	Clinics - I(IE)	-	30 hours	-	-	-	50	50		

UE University Exams

SCHEME OF EXAMNINATION SEMESTER – IV (B.OPTOM)

Total Hours: 420Hr

	PAPER		Hours / Semester		Evaluation (Marks)					
S.no			Practical	Con s asse (Int	tinuou ssment ernals)	End Sem Examination (\ Department	ester University/ Exams)	Total		
				Theory	Practical	Theory	Practical			
1.	Visual Optics I &II (Theory) (UE)	60 hours	-	20	-	80	-	100		
2.	Optometric Optics I & II And Dispensing Optics (Theory) (UE)	60 hours	-	20	-	80	-	100		
3.	Visual Optics I & II And Dispensing Optics (Practicals) (UE)		150	-	20	-	80	100		
4.	Optometric Instruments (Theory) (UE)	60 hours	-	20	-	80	-	100		
5.	Clinical Examination Of Visual System(IE)		-	-	-	50	-	50		
6.	Nutrition(IE)		-	-	-	50	-	50		
7.	Clinics - II(IE)	-	30 hours	-	-	-	50	50		

UE University Exams

SCHEME OF EXAMNINATION SEMESTER – V (B.OPTOM)

Total Hours: 450Hr

		Hours / Semester		Evaluation (Marks)					
S.no	PAPER		Practical	Cont s asse (Inte	tinuou ssment ernals)	End Sem Examination (I Department	ester University/ Exams)	Total	
				Theory	Practical	Theory	Practical		
1.	Ocular Diseases - I (Theory) (UE)	60 hours	-	20	-	80	-	100	
2.	Ocular Diseases- II & Glaucoma (Theory) (UE)	60 hours	-	20	-	80	-	100	
3.	Low Vision And Contact Lens (Theory) (UE)	60 hours	-	20	-	80	-	100	
4.	Low Vision And Contact Lens (Practical) (UE)	-	150 hours	-	20	-	80	100	
5.	Systemic Diseases (IE)	30 hours	-	-	-	50	-	50	
6.	Special Clinics – I (IE)	-	30 hours	-	-	-	50	50	
7.	Bio-Statistics and Research Methodology(IE)	30 hours	-	-	-	50	-	50	
8.	Environmental Science And Community Medicine (Elective)/Advanced Diagnostic techniques(Elective)	30 hours	-	-	-	50	-	50	

SCHEME OF EXAMNINATION

SEMESTER – VI (B.OPTOM)

Total Hours: 390 Hr

	PAPER		Hours / Semester		Evaluation (Marks)					
S.no			Theory Practical		tinuou ssment ernals)	End Semester Examination (University/ Department Exams)		Total		
				Theory	Practical	Theory	Practical			
1.	Occupational Optometry &Public Health And Community Optometry-Theory(UE)	60 hours	-	20	-	80	-	100		
2.	Geriatric Optometry & Paediatric Optometry(-Theory (UE)		-	20	-	80	-	100		
3.	Binocular Vision I&II - Theory (UE)		-	20	-	80	-	100		
4.	Binocular Vision I&II – Practical (UE)		150 hours	-	20	-	80	100		
5.	Sports Vision(IE)	30 hours	-	-	-	50	-	50		
6.	Special Clinics – II (IE)		30 hours	-	-	-	50	50		
7.	Hospital Management/Applied clinical research (Elective) (IE)	30 hours	-	-	-	50	-	50		

UE University Exams

SEMESTER – VII (FOR ALL SPECIALITIES)

Project/Dissertation

		Hours / S	emester	Evaluation (Marks)				
				Continuous				
				assessment		End Semester		
				(Inte	ernals)	Exami	nation	
S.No	Paper	Theory	Practical	Project	Viva	Project	Viva	Total
1.	Project/ Dissertation(UE)	-	-	100	-	100	_	200

SEMESTER – VII & VIII (FOR ALL SPECIALITIES)

Internship -1 year

UE University Exams IE Internal Exam

SEMESTER - I

S.No:	Subject
1.	Anatomy – I (UE)
2.	Physiology –I (UE)
3.	Biochemistry - I(UE)
4.	Microbiology - I(UE)
5.	Pathology – I(UE)
6.	English (IE)

<u>SEMESTER - I</u> <u>ANATOMY – I (UE)</u>

Objectives:

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be "human".

Learning Objectives: Skills

- Identify the anatomical structure in the dissected specimen.
- Learn to correlate anatomical structures with relevant clinical conditions.

CONTENTS

Unit I

Organization of the Human Body

- Introduction to the human body
- Definition and subdivisions of anatomy
- Anatomical position and terminology
- Regions and Systems of the body
- Cavities of the body and their contents
- Levels of organization of the body

Cell

- Definition of a cell, shapes and sizes of cells
- Parts of a cell cell membranes cytoplasm, sub cellular organelles and their main function
- Cell Division Definition and main events that occur in different stages of mitosis and meiosis.

Tissues

- Tissues of the body
- Definition and types of basic tissues
- Characteristics, functions and locations of different types of tissues

Unit II

Systems of Support and Movement

1. Skeletal system

- Skeleton Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Parts of bones. Functions of bones. Name location and general features of the bones of the body.
- Joints Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, movements possible.
- 2. Muscular system
- Parts of the skeletal muscle. Definition of origin and insertion. Name and location of the skeletal muscles of the body.Origin, insertion, nerve supply and action of large muscles like sternocleidomastoid, pectoralis major, deltoid, Biceps brachial, Triceps brachia, gluteus, gastronemius and diaphragm.

Unit III

Control Systems of the Body

- 1. Nervous system
- Sub-divisions of the nervous system
- **Spinal cord** Location, extent, spinal segments, external features and internal structure.
- Brain Sub-divisions, location external features of medulla oblongata, pons, midbrain, cerebellum and cerebrum. Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord.
- **Cranial nerves** Name, number, location and general distribution.

- **Spinal nerves** Typical spinal nerve groups and number of spinal nerves. Name and location of cervical plexus and brachial plexus. Location and general distribution of the branches.
- Autonomic Nervous system -definition and functions
- 2. Sense organs
- Location and features of the nose, tongue, eye, ear and skin
- 3. Endocrine system
- Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes. Names of hormones produced by each gland.

PRACTICAL & VIVA VOICE

- 1. Histology Epithelium
- 2. Axial & Appendicular Skeleton With Names & Number Of Bones
- 3. Muscles
- a. Trapezius
- b. Lattisimus dorsi
- c. Biceps
- d. Triceps
- e. Deltoid
- 4. Nervous System
- a. Cerebrum
- b. Cerebellum
- c. Brain Stem
- d. Spinal Cord
- 5. Special Senses
- a. Tongue
- b. Ear
- c. Skin
- d. Eye

6. Viva Voice

- a. Radiology X rays
- b. Osteology
- c. Charts
- d. Models
- e. Gluteus Muscles

Recommended books:

- 1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha
- 2. B D Chaurasia: General human anatomy

References:

- 1. B D Chaurasia: Regional Anatomy. Vol I, II, III
- 2. Richard S. Snell: Clinical Anatomy

PHYSIOLOGY-I

Objectives of the course:

At the end of this course the students should be able to:

- Comprehend basic terminologies used in the field of Human Physiology
- Define and describe basic Physiological processes governing the normal functioning of the human body.
- Apply this knowledge in their Allied Health Science practice.

CONTENTS

Unit 1

General Physiology

- Concept of Homeostasis
- Cell structure and functions
- Transport across membranes

Nerve and muscle

- Nerve structure, classification of nerve fibers,
- Muscles- classification, structure, Neuro-Muscular junction(NMJ).
- Muscle contraction-mechanism, types.

Blood and body fluids

- Body fluid volumes, compartments, and composition
- Blood composition and functions
- Plasma proteins
- Erythrocytes Morphology and functions
- Leucocytes-Morphology and functions
- Platelets-Morphology and functions
- Blood groups.

Unit II

Digestive system

- Salivary glands -Nerve supply, functions of saliva.
- Gastric juice-composition & functions of gastric juice.
- Pancreatic juice- composition, functions and regulation of pancreatic juice.
- Bile- composition, functions of bile and bile salts.
- Succus entericus and small intestinal movements.
- Deglutition, vomiting, functions of large intestine.

Excretory system

- 1. Structure of Nephron and its blood supply, Juxtaglomerular Apparatus(JGA).
- 2. Formation of urine-Filtration, Reabsorption and secretion.
- 3. Counter-Current mechanism
- 4. Micturition.

PRACTICAL & VIVA VOICE

- Microscope
- Estimation of Hemoglobulin
- RBC
- WBC
- Spotters

Recommended book

1. Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

Reference books

- 1. Medical physiology for under graduates by Indhu Khurana,
- 2. Text Book of Physiology by A.K. Jain for BDS.

BIOCHEMISTRY-I (UE)

Objectives:

At the end of this course the students should be able to:

- To have a knowledge about the chemistry and metabolism of various macromolecules- carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

CONTENTS

Unit I - CARBOHYDRATES

Carbohydrates:

- Classification of carbohydrates and their biological importance,
- Reducing property of sugars.

Metabolism of Carbohydrates :

- Digestion and Absorption of carbohydrates,
- Steps of Glycolysis and energetics,
- Steps of TCA cycle and energetics,
- Steps of Glycogen synthesis and breakdown,
- Significance of HMP shunt pathway,
- Definition and steps of Gluconeogenesis, Galactose metabolism
- Galactosemia.
- Diabetes mellitus,

Bioenergetics :

• Importance of ATP, Outline of respiratory chain.

Unit II - LIPIDS

Lipids:

- Classification of lipids,
- Essential fatty acids,
- Functions of cholesterol,
- Triglycerides,
- Phospholipids

Metabolism of Lipids :

- Digestion and Absorption of lipids,
- Fatty acid synthesis & Steps of β oxidation of fatty acids,
- Types and functions of lipoprotein,
- Lipid profile, hyper cholesterolemia

Unit III - VITAMINS

Vitamins:

- Vitamins, its classification
- Vitamin A
- Vitamin D
- Vitamin E & K
- Vitamin B complex
- Vitamin C

Unit IV - ENZYMES

Enzymes:

- Definition,
- Classification,
- Coenzymes,

Factors affecting enzyme activity, Types and examples of enzyme inhibition

PRACTICAL & VIVA VOICE

- **1.** Reactions of Glucose
- **2.** Reactions of Fructose
- **3.** Reactions of Maltose
- 4. Reactions of Lactose
- **5.** Tests for Sucrose
- **6.** Tests for Starch
- 7. Identification of unknown Carbohydrates

SPOTTERS

- CRYSTALS
 - Maltosazone
 - Lactosazone
 - Glucosazone/Fructosazone

• **REAGENTS**

- Benedict's reagent
- Barfoeds reagent
- Foulgers reagent
- Seliwanoff reagent
- Fouchets reagent
- CHEMICALS
 - Sodium Acetate
 - Phenyl hydrazine
 - α Naphthol
- STRUCTURES.
 - Structure of Cholesterol
 - Structure of Glucose
 - Structure of Fructose

• VITAMINS

- Carrots
- Rickets
- Scurvy
- Egg

Text books Recommended :

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

Reference books :

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7th Edition
- Harper's Illustrated Biochemistry 30th Edition.

MICROBIOLOGY - I (UE)

OBJECTIVE:

At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them.

Contents

<u>Unit I:</u>

	General Microbiology-History and Introduction of Microbiology,
	Microscopy and Morphology of bacterial cell and their function,
	Growth and nutrition of Bacteria, Sterilization and Disinfection,
	Culture media, Culture methods and Identification of bacteria.
<u>Unit II</u> :	
	Immunology-Basic concept about Infection (Source, Portal of
	entry and Spread), Immunity, Antigen, Antibody, Antigen-
	Antibody reaction, Hypersensitivity.
<u>Unit III</u>	
	Systemic bacteriology- Disease caused and lab diagnosis of
	medically important bacteria (Staphylococcus, Streptococcus,
	Neisseria, Echerichia coli, Salmonella, Shigella, Vibrio,
	Mycobacteria, Spirochetes)

PRACTICAL & VIVA VOICE

1. Gram staining

2. Spotters:

- Disposable syringe
- Sterile cotton swab
- Bacteriological loop
- Sterile tube
- McIntosh fildes Jar
- Autoclave
- Nutrient Agar plate
- Mac Conkey agar plate
- Mac conkey with LF
- Mac conkey with NLF
- Blood agar plate
- L J Media
- RCM
- BHI broth
- Antibiotic susceptibility test
- Gram Positive Cocci in Clusters
- Gram negative bacilli
- AFB
- VDRL Slide
- Microtitre plate

RECOMMENDED BOOK:

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

REFERENCE BOOKS:

- 1. Ananthanaryanan and Paniker's Textbook of Microbiology.
- 2. Subhash Chandra Parija Textbook of Microbiology.

PRACTICAL BOOK:

1. Patwardhan, Bhat, Satish Patwardhan - Handbook of Practical examination in Microbiolog

PATHOLOGY-I (UE)

Objective:

At the end of the semester the students should be able to

- To develop better understanding of pathological conditions and their causes.
- To develop knowledge on the diseases of major organs and structures.

Contents

Unit-I. Introduction to cell

• Normal Cell Structure Function

Unit-II.Cell injury and Adaptation

- Causes and Types of Cell Injury
- Cellular Adaptations- (Hypertrophy, Hyperplasia, Atrophy, Metaplasia)
- Necrosis-Definition, Causes, Types with Examples, Morphology
- Apoptosis-Definition, Causes, Morphology
- Pathological Calcification

Unit-III.Inflammation and Repair

- Inflammation-Definition, Types, Cardinal signs
- Acute Inflammation-Vascular events and Cellular events(ONLY NAMES), Outcomes of Acute inflammation, Morphological types of Acute inflammation(ONLY NAMES), Chemical Mediators(ONLY NAMES)
- Chronic Inflammation- Causes and Granulomatous inflammation
- Wound Healing and Repair- Definition, Steps in wound healing, Factor influencing wound healing, Complications of wound healing(ONLY NAMES)

Unit-IV.Hemodynamic Disorder

- Edema- Definition, Causes and Pathogenesis
- Thrombosis-Definition, Causes and Fate of thrombus
- Embolism-Definition and Types
- Infarction-Definition and Classification
- Shock-Definition, Stages, Types of Shock, Etiopathogenesis of Septic shock

Unit-V.Infectious Disease

- Tuberculosis-Etiology, predisposing factors, primary & secondary tuberculosis and complications
- Leprosy-Etiology, classification, Lepromatous and tuberculoid leprosy

Unit-VI.Neoplasia

- Definition, Nomenclature & Classification
- Characteristics of Benign ad Malignant neoplasms,
- Pathogenesis of Cancer(Only Names of Carcinogenic agents)
- Spread of Cancer(Metastasis and Pathways of spread)

Unit-VII.Genetics

- Down syndrome
- Klinfelter syndrome
- Turner syndrome

Unit-VIII. Radiation

• Effects of Radiation

PRACTICAL & VIVA VOICE

• DIFFERENTIAL COUNT

- Spotter

• **GROSS (SPOTTER)**

- Fatty liver
- Lipoma
- Dry gangrene foot
- Wet gangrene bowel
- CVC Spleen
- Hydatid cyst
- TB Lung
- INSTRUMENTS
 - Westergrens ESR tube
 - Sahlihemocytometer
 - Neaubaur's chamber
 - Bone Marrow Needle

Recommended Textbook:

1. Textbook of Pathology ,Harsh Mohan,3rd edition **Reference book:**

- 1. Harsh Mohan,3rd edition Text book of Pathology
- 2. Dr. Ramddas Nayak, Publisher: Jaypee Text book of Pathology

ENGLISH (IE)

General objectives:

At the end of the semester the students should be able to

- To improve comprehensive and writing skills in English
- To discuss about effective communication skills
- To prevent barriers in communication.

Unit I: Grammar

- Components of a sentence
- Positive and Negative statements
- Interrogative Statement
- Parts of speech in brief
- Transformation and synthesis of sentences
- Verb and Tense forms
- Voice
- Reported Speech
- Common errors and how to avoid them

Unit II. Vocabulary

- Medical Terminology
- Words often confused or misused
- Words and expression in British and American English
- Idioms and Phrases

Unit III. Oral communication

- Importance of speaking efficiently
- Voice culture
- Preparation of Speech
- Secrets of good delivery
- Audience Psychology
- Presentation Skills
- Using non-verbal communication
- Interview technique
- Skill in arguing

Unit IV. Spoken English

- The phonetic symbols
- Stress
- Intonation
- Rhythm
- Transcription
- Using dictionaries for learning to pronounce

Unit V. Written communication

(a) Art of writing

- Rules for effective writing
- Expansion of proverbs & Ideas
- Précis writing

(b) Letter writing

- Private letters & Social letters
- Business letters
- Letter to a Bank
- Letter to a Newspaper
- Letter to Application
- Curriculum Vitae (Different models)
- Placing an order

(c) Report writing

- Guidelines to prepare a good report
- Usage of impersonal language
- Preparing lab reports

(d) Note making and Note taking

- Note making and note taking strategies
- Organizing notes
- Exercise and note making / taking

(e) Comprehension

• Listening and reading comprehension (Exercise of prescribed short answers)

Unit VI. Reading

- What is efficient and fast reading?
- Awareness of existing reading habits
- Tested techniques for improving speed
- Improving concentration and comprehension through systematic study.

Reference Books:

- 1. English for Competitive Examinations by R.P.Bhatnagar, Rajiel Bhargava
- 2. English for college and competitive exams by Dyvadatham
- 3. Written Communication in English by Sarah Freeman
- 4. Writing with a purpose by Tickoo & Sasikumar
- 5. English phonetics for Beginners by P.Iyadurai
- 7. Empowerment through verbs & idioms by Padmini devkumar
- 8. High School English Grammer and Composition by Wren & Martin
- 9. Communication techniques for your success everywhere by Muralidharan.

SEMESTER-II

S.No:	Subject
1.	Anatomy – II (UE)
2.	Physiology –II (UE)
3.	Biochemistry – II(UE)
4	Microbiology – II(UE)
5.	Pathology – II(UE)
6.	Pharmacology(UE)
7.	Physics(IE)
8.	Computer science (IE)

SEMESTER II

ANATOMY – II (UE)

Objectives:

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be "human".

<u>Unit I</u>

Maintenance of the Human Body

a) Cardio-vascular system

- Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall, conducting system of the heart.
- Blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of principal arteries and veins.

b) Lymphatic system

• Lymph, lymphatic vessels, name, location and features of the lymphatic organs.

c) Respiratory system

• Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

<u>Unit II</u>

a) Digestive system

 Names of organs of digestion. Parts of alimentary canal and accessory organs. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder.
b) Urinary system

• Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra.

<u>Unit III</u>

a) Reproductive system

 Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus and its supports, uterine tube, ovary vagina vulva and breast.

b) Anatomical Regions

• Simple ideas about scalp, triangles of neck, axilla, cubital fossa, mediastinum, inguinal canal, femoral triangle, popliteal fossa.

PRACTICAL & VIVA VOICE

• Endocrine System

- Pituitary gland
- Pineal body
- Thyroid & parathyroid gland
- Adrenal
- Pancreas
- Gonads Ovary & Testis

• Cardio-Vascular System

- Heart
- Lymphatic system
 - Spleen

Respiratory System

- Lungs
- Larynx
- Trachea

• Digestive System

- Salivary glands
- Esophagus
- Pharynx
- Stomach
- Liver, Gall bladder
- Duodenum
- Small intestine
- Large intestine

• Urinary system

- Kidneys
- Ureter
- Urinary bladder

• Reproductive System

- Sagittal section Male & Female pelvis
- Uterus & ligaments
- Ovary
- Prostate
- Seminal vesicles
- Vas deferens
- Testis
- Viva Voice
 - Radiology Xrays
 - Osteology
 - Charts
 - Models

Recommended books:

- 1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha.
- 2. B D Chaurasia: General human anatomy.

References:

- 1. B D Chaurasia: Regional Anatomy. Vol I, II,III.
- 2. Richard S. Snell: Clinica

PHYSIOLOGY-II (UE)

Objectives:

- To develop vocabulary for appropriate terminologies to effective communicate terms related to physiology of various body systems
- To identify and describe physiological functions of various structures involved in smooth functioning of the body.

Unit I Cardiovascular System

- Cardiac muscle, action potential and conducting system of the heart.
- Cardiac cycle.
- ECG, heart sounds, Heart Rate.
- Cardiac output-Definition ,factors regulating cardiac output and measurement of cardiac output.
- Blood pressure-Definition, measurement, factors maintaining BP.
- Regional circulation-Coronary and cerebral.

Unit -II Nervous system

- Structure& Properties of Neuron.
- Nerve- Classification, injury.
- Types and properties of Receptors
- Synapse and synaptic transmission.
- Reflex and its properties.
- Spinal cord-Ascending & Descending tracts.
- Thalamus , Basal ganglia , Cerebellum, Cerebral cortex, Hypothalamus &Cerebrospinal fluid.
- Autonomic nervous system.
- Ascending and desending tracts.

Unit -III Respiratory system

- Structure of upper and lower respiratory tract. Muscles of respiration and Mechanism of respiration.
- Lung volumes and capacities-definition ,normal values, intrapulmonary and intra pleural pressures, surfactant.
- Oxygen transport, carbon-dioxide transport.
- Neural and chemical regulation of respiration.
- Hypoxia ,cyanosis, Artifical Respiration.

Unit – IV Special sense and skin

- Vision,
- Audition,
- Olfaction,
- Gustation.

Unit – V Reproductive system

- Male reproductive organs-Spermatogenesis and testosterone actions.
- Female reproductive organs.
- Contraception Methods.

Unit – VI Endocrine system

- Hypothalamus hypophyseal inter relationship.
- Anterior pituitary hormones and their functions.
- Posterior pituitary hormones and their actions.
- Thyroid hormones, biosynthesis and functions.
- Parathyroid hormones ,functions.
- Insulin, glucagons, actions and Diabetes mellitus.
- Adrenal cortex hormones and their functions.
- Adrenal medullary hormones and their actions

PRACTICAL & VIVA VOICE SYLLABUS

- 1. WBC.
- 2. Blood pressure.
- 3. Bleeding time
- 4. Clotting time.
- 5. Charts and spotters.

Recommended book

• Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

Reference books

- Medical physiology for under graduates by Indhu Khurana,
- Text Book of Physiology by A.K. Jain for BDS.

BIOCHEMISTRY – II (UE)

Objectives:

At the end of the semester the students should be able

- To have a knowledge about the chemistry and metabolism of proteins
- To learn about nutrition-balanced diet and malnutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

Unit I - PROTEINS

Proteins :

- Classification of amino acids,
- Structure of proteins,
- Plasma proteins,
- Immunoglobulins.

Metabolism of Proteins :

- Digestion and absorption of proteins,
- Transamination,
- Deamination,
- Steps of urea cycle,
- Phenyl ketonuria,
- Alkaptonuria,
- Transmethylation,
- Products derived from Glycine and tyrosine

Unit II -- NUCLEIC ACIDS

Nucleic acids:

- Structure & Function of DNA,
- Structure, Its types & Functions of RNA
- Nucleic Acid Metabolism

Unit III - HAEMOGLOBIN

Haemoglobin:

- Structure & Function of Haemoglobin
- Haemoglobin Metabolism

Unit IV-- MINERALS

Minerals:

• Macro & Minor Minerals & Metabolism

Unit V -- NUTRITION

Nutrition:

- BMR, SDA & Glycemic Index
- Dietary Fibers & Balanced Diet
- Protein Energy Malnutrition

Unit VI -- ORGAN FUNCTION TEST

• RFT

Unit XI - ACID BASE BALANCE

Acid Base Balance:

- pH Homeostasis
- Buffers
- Buffers
- Acidosis
- Alkalosis

PRACTICAL & VIVA VOICE

- Non- Protein Nitrogenous Substances
- Analysis Constituents of normal urine
- Analysis Constituents of abnormal urine
- Identification of abnormal constituents in urine
- Estimation of Glucose in blood
- Estimation of Urea in blood.

Spotters

Spotters: The student must identify the spotter and write some important uses of the spotter.

- 1. Urinometer
- 2. Lactometer
- 3. Centrifuge
- 4. Spectroscope
- 5. Colorimeter
- 6. pH meter
- 7. Ryles' Tube
- 8. Chromatography apparatus
- 9. Electrophoresis apparatus
- 10. Micropipette
- 11. Fluorosis
- 12. Inborn Errors of Metabolism
- 13. Protein Energy Malnutrition
- 14. Benzidine powder
- **15.** Sulphur powder
- 16. Fouchet's Reagent
- **17.** Structure of t RNA
- 18. Egg White
- 19. Jaundice
- 20. Gout

Text books Recommended:

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

Reference books:

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7th Edition
- Harper's Illustrated Biochemistry 30th Edition.

MICROBIOLOGY – II (UE)

OBJECTIVE:

At the end of the semester the students should be able to

- Explain general and specific mechanisms by which an infectious agent likes viruses, fungi and parasites causing diseases.
- Explain interventions employed to prevent infectious diseases including infection control measures and vaccines.
- **Unit-I Virology**: Introduction to virology, List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio) and Lab diagnosis of viral infections

<u>Unit - II</u>

Mycology: Introduction to Mycology, List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis) and Lab diagnosis of fungal infections.

<u>Unit - III</u>

Parasitology: Introduction to Parasitology, List of medically important parasites and diseases (E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma) and Lab diagnosis of parasitic infections

Unit - IV

Applied Microbiology-Collection and transport of clinical specimen, Sexually transmitted disease, Hospital acquired infection, Urinary tract infection, Skin and Soft tissue infection, Anaerobic infection, Respiratory tract infection and Bloodstream infection, Immunoprophylaxis, Biomedical Waste Management and standard precautions.

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PRACTICAL & VIVA VOICE

I.SPOTTERS

- 1. Ascaris lumbricoides
- 2. Taenia
- 3. Gram stained smears showing Candida
- 4. Universal container
- 5. Vaccine-OPV
- 6. BCG
- 7. Hepatitis
- 8. DPT
- 9. TT
- 10. MMR
- 11. Virology Embryonated egg
- 12. Tissue culture
- 13. Rhabdovirus
- 14. Polio virus
- 15. HIV

II. Clinical case discussion with charts

- 1. Skin and soft tissue infections
- 2. Ring worm/ Tinea infections
- 3. Food poisoning
- 4. Gastroenteritis

RECOMMENDED BOOK:

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

REFERENCE BOOKS:

- 1. Ananthanaryanan and Paniker's Textbook of Microbiology.
- 2. Dr.C.P.Baveja Textbook of Microbiology.

PRACTICAL BOOK:

 Patwardhan, Bhat, SatishPatwardhan – Handbook of Practical examination in Microbiology.

PATHOLOGY- II (UE)

UNIT-1: CARDIOVASCULAR SYSTEM

- Ischemic Heart Disease
- Myocardial Infarction-Definition, Etiopathogenesis and Morphology
- Valvular Heart Disease
- Rheumatic Heart Disease- Defintion, Etiopathogenesis and Morphology
- Infective Endocarditis- Definition, Etiopathogenesis and Morphology
- Congenital Heart Diseases- Only Names
- Hypertension- Definition, causes, Morphology and Complications
- Atherosclerosis- Definition, Etiopathogenesis, Morphology and Complications

UNIT-2: RESPIRATORY SYSTEM

- Pneumonia- Definition, Etiopathogenesis and Morphology
- COPD-(Emphysema, Chronic Bronchitis, Bronchial Asthma) Definition, Etiopathogenesis and Morphology
- Bronchiectasis- Definition, Etiopathogenesis and Morphology

UNIT-3: GASTROINTESTINAL SYSTEM

- Gastritis and Peptic ulcer disease- Definition, Etiopathogenesis, Morphology and Complications
- Tumors of GIT
- Gastric carcinoma-Etiology and Morphology

UNIT-4: HEPATOBILIARY SYSTEM

- Liver Abscess
- Amoebic liver abscess
- Alcoholic Liver Disease and Liver Cirrhosis- Definition, Etiopathogenesis, Morphology and Complications, Jaundice- Definition, Pathophysiology, Types and Causes
- Viral Hepatitis- Definition, Etiology and Morphology
- Cholecystitis

UNIT-5: RENAL AND URINARY SYSTEM

- Renal Calculus- Etiology, Types and Complications
- UTI and Pyelonephritis Causes, Etiopathogenesis, Morphology and Complications
- Renal Cell Carcinoma- Causes and Names of Tumors
- Renal Failure
- Acute Glomerulonephritis/Nephritic syndrome and Nephrotic syndrome- Definition, Causes, Clinical Presentation and Complications

UNIT-6: REPRODUCTIVE SYSTEM

• Diseases of Testis, Uterus, Cervix, Ovary- Only Names

UNIT-7: CENTRAL NERVOUS SYSTEM

- Infection
- Meningitis- Definition, Causes and CSF Findings

UNIT-8: DISEASES OF BONES & JOINTS

- Septic Arthritis
- Osteomyelitis-Definition, Causes, Morphology and Complications
- Rheumatoid Arthritis- Definition, Etiopathogenesis and Morphology
- Bone Tumors- Only Names

UNIT-9: ANEMIA

- Anemia- Definition, Classification
- Iron deficiency and Megaloblastic Anemia- Etiology and Morphology

UNIT-10: AUTOIMMUNE DISEASES

• Definition and Names of common autoimmune diseases

PRACTICAL & VIVA VOICE

INSTRUMENT TEST

- RBC Pipette
- WBC Pipette
- Sahli's Pipette
- Wintrobe's PCV tube
- Hb Estimation
- Blood grouping

SPECIMEN

- Chronic Pyelonephritis
- RCC
- SCC Foot
- Leiomyoma Fibroid uterus
- Gall stones
- Appendicitis
- Liver abscess

Recommended Textbook:

1. Textbook of Pathology ,Harsh Mohan,3rd edition

Reference book:

- 1. Harsh Mohan,3rd edition Text book of Pathology
- 2. Dr. Ramddas Nayak, Publisher: Jaypee Text book of Pathology

Dr.Ramddas Nayak, Publisher: Jaypee - Text book of Pathology and Genetics

PHARMACOLOGY (UE)

COURSE OBJECTIVES:

- To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic involved in the use of drugs.
- To understand the pharmacological action and mechanism of action of common drugs used for different disease conditions.
- To know the therapeutic uses and adverse effects of common drugs used for different disease conditions

Unit I: Introduction

- General pharmacological principles-Definition-Routes of drug administration-Pharmacokinetics-
- Pharmacodynamics-Adverse drug effects
- Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system

Unit II

• General considerations-Cholinergic system & drugs-Anticholinergic drugs-Adrenergic drugs-antiadrenergic drugs-Drugs acting on autonomic ganglia.

Unit III:

 Skeletal muscle relaxants-Local anaesthetics,General anaesthetics-Ethyl & Methyl alcohol-Sedatives-Hypnotics-Antiepileptics-Antiparkinsonian drugs-Drugs used in mental illness-Opioid analgesics and Non opioid Analgesics-Nonsteroidal Antiinflammatory drugs

Unit IV

- Cardiovascular drugs , Drugs affecting Blood & Blood formation and Drugs on Respiratory system
- Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Antihypertensives and Diuretics, Haematinics, Erythropoietin, Drugs affecting-

coagulation,Fibrinolytic and Antiplatelet drugs,Treatment of cough and antiasthmatic drugs.

Unit V

- Antimicrobial drugs
- General consideration-Antibiotics-Antibacterial agents-Antitubercular drugs-Antifungal-Antileprotic-Antiviral-Antimalarial-Antiamoebic-Antiprotozoal drugs-Cancer Chemotherapy, Antiseptic-Disinfectant-others.

Unit VI

- Hormones & related Drugs, Drugs used in Gastrointestinal diseases & Miscellaneous drugs
- Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer
- Vitamins, Vaccines, Sera and chelating agents.

Recommended books:

- Prep Manual for Undergraduates in Pharmacology by Tara V Shanbag, 2nd edition
- 2. Pharmacology for Dental and Allied Health Sciences by Padmaja Udaykumar, 3rd edition

Reference books:

- 1. Essentials of Medical Pharmacology by KD Tripathi, 7th edition
- 2. Basic and Clinical Pharmacology by Bertram G Katzung, 12th edition

PRACTICAL & VIVA VOICE

Learning Objective

This module is intended to discuss the various modalities of drug delivery and instruments relevant to it.

- Instruments
- Needles
 - o Intravenous
 - o Intrathecal
 - o Spinal
 - Intra arterial

- Syringes:
 - Tuberculin
 - \circ Insulin
 - I.V cannula
 - Scalp. Vein set
- Students Discussion
 - \circ Enema can
 - Inhalers
 - Spacers
 - Nebulizers
- Tablets
 - Enteric coated,
 - o Sustained release,
 - Sub-lingual
- Students Discussion
 - o Capsules
 - o Spansules
 - Pessary
 - Suppository
 - Topical Preparation
 - o Ointment,
 - o Lotion,
 - o Powder,
 - \circ Drops eye / ear
- Charts:
 - o Mechanism of action of drugs, adverse effects, toxicology
- Spotters:
 - o drugs

Text books suggested for reading:

- Text book of pharmacology for Dental &Allied Health Science 2rd edition Padmaja Udaykumar
- Pharmacology for dental students Tara V shanbhag, Smita Shenoy, Veena Nayak
- Principles of pharmacology 2rd edition H.L.Sharma & KK Sharma

PHYSICS (IE)

Unit 1: Basic concepts

Basic Units, Heat, Acoustics etc. Basic concepts of power, work, force, energy Einstein's formula Electronics, Electricity & Magnetism, electromagnetic waves Units and measurements temperature and heat SI units of above parameters Atomic structure Nucleus Atomic Number, Mass Number electron orbit and energy levels Periodic table Isotopes Isobars Ionization and excitation Radioactivity, Natural and artificial radioactivity alpha decay beta decay.

Unit 2: Electromagnetic induction

Electric charges electric induction electric potential capacitance and capacitors. Electrical energy and power unit of current resistance and Ohm's law circuit laws heating effect of current sources of electrical energy E.M.F. Magnetism, Magnetic effect of an electric current application of magnetic field. Electromagnetic induction, laws of mutual induction and self-induction. Alternating current transformers theory and losses practical aspects reactance –resonance impedance and power factors.

Unit 3: Laser

Nature of light-Reflection-Refraction-Total internal reflection- Optical fibers-Applications in Medicine - Laser-Principles-Action-Types of laser, Basic principles of laser in Medical application - Argon-Iron laser photo coagulator-Photo thermal-Photochemical application - Applications of laser in Medicine- Laser hazards and safety measures.

Unit 4: Radiation Physics

Introduction to nuclear physics and radioactivity, Radioactive radiations - X-ray, production of x-ray, Properties of x-ray radiations - Biological effects of radiation, Radiation damage in matter, Radiation protection principles, radiation detection and measurement - Ultrasound and generation of ultrasound.

Unit 5: Introduction to Imaging Technique

Principles of Microscope: Simple microscope and compound microscope -Radiography: Making an X-ray image –Fluoroscopy-. CT Scans, MRI -Ultrasonography: Ultrasound picture of Body-A-Scan-B-Scan-M-Scan-Ultrasound diathermy-Phonocardiography - Radio isotopes: Uses of radio isotopes -99mTc Generator- Scintillation detectors - Application of scintillation detectors - Gamma Camera - Positron Camera.

Unit 6: Semiconductor devices

Principles of diodes and Transistors – Integrated circuits – Amplifiers – Basic configuration and types – differential and operational amplifiers– Waveform generators – Timer – A/D and D/A converters – Active filters – Transducers – Basic configuration and types.

Unit 7: Biopotential Recording Systems

Introduction to bioelectric potential – Electrodes and surfaces – Biopotential amplifier – Frequency ranges of various Bio potential signals – Working principles of bio potential recording systems – Electrocardiography – Electroencephalography – Electromyography.

Recommended books:

- 1. New Understanding physics for advanced level-JimBreithauput.
- 2. Advanced Physics for you by Keith Johnson, Simmon shewett, Sueholt,Johnmiller
- Christensen's Physics of diagnostic Radiology by Thaomas S.CurryIII, M.D., Robert C Murry, Jr. PhD., Dow Dey, PhD.
- Applied Electronics, A. Subramanyam, The National Publishing co., Madras(1996).

Computer Science (IE)

Unit-I. History of computers,

• Definition of computers, Input devices, Output devices, Storage devices, Types of memory and units of measurement, Range of computers, Generations of computers, Characteristics of computers

Unit-II. System:

• Hardware, Software, system definition, Fundamentals of Networking, Internet, Performing searches and working with search engines, types of software and its applications

Unit-III. Office application suite

• Word processor, spreadsheet, presentations, other utility tools, Fundamentals of Linux / Windows operating system, functions, interfaces, basic commands, working with the shell and other standard utilities.

Unit-IV. Language

 Comparison chart of conventional language, Programming Languages, Generations Of Programming Languages,Compilers and Interpreters, Universal programming constructs based on SDLC, Variable, constant, identifiers, functions, procedures, if while, do – while, for and other Structures. Programming in C language, Data types, identifiers, functions and its types, arrays, union, structures and pointers

Unit-V. Introduction to object oriented programming with C++:

• Classes, Objects, Inheritance Polymorphism and Encapsulation. Introduction to databases, and query languages, Introduction to Bioinformatics.

Practicals:

1. Various browsers, search engines, email

2. Text document with mages with multiple formatting options using a specified office package

- 3. Spreadsheet using a specified office package
- 4. Presentation on a specified topic using the specified locations
- 5. Shell programming-parameters
- 6. Shell program- regular expressions
- 7. C program- functions
- 8. C program file handling
- 9. C program demonstrating the usage of user defined variables
- 10. Databases
- 11. Applications in allied health sciences

Text Books:

- 1. Peter Norton., Introduction to Computers. 7th Edition, Tata McGraw Hill Education Private Limited 2010.
- Gary B. Shelly, Thomas J. Cashman, Misty E. Vermaat., Microsoft Office 2007. 1stEdition, Delmar Cengage Learning 2010

Reference Books:

- 1. C programming tutorial (K&R version 4) Author(s) Mark Burgess
- 2. Red hat Linux 9 bible by Christopher Negus May 2003

SEMESTER-III

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S.NO	SUBJECT
1.	Ocular Anatomy and Ocular Physiology- (Theory) (UE)
2.	Ocular Anatomy and Ocular Physiology- (Practical) (UE)
3.	Geometrical Optics & Physical Optics (Theory) (UE)
4.	Geometrical Optics & Physical Optics (Practical) (UE)
5.	Medical Ethics& Biosafety (IE)
6.	Psychology (IE)
7.	Clinics - I(IE)

SEMESTER –III

OCULAR ANATOMY& OCULAR PHYSIOLOGY -THEORY(UE)

OCULAR ANATOMY:

OBJECTIVES: At the end of the course, the student should be able to:

- Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa.
- Identify the microscopic structures of various tissues in the eye and correlate the structure with the functions.
- Comprehend the basic structure and connections between the various parts of the central nervous system and the eye so as to understand the neural connections and distribution.
- To understand the basic principles of ocular embryology and the phenomenon of vision .
- List the physiological principles underlying pathogenesis and treatment of diseases of the eye, explain the normal functioning of all structures of the eye and their interactions and elucidate the physiological aspects of normal growth and development of the eye

UNIT -I

- Embryology of eye
- Histology of eye

UNIT –II

Anatomy of Eyeball – including muscle, blood and nerve supply

- Orbit
- Eyelid
- Lacrimal apparatus
- Sclera
- Conjunctiva
- Choroid
- Ciliary body
- Iris
- Retina

Refractory media

- Cornea
- Aqueous humor
- Anterior chamber
- Posterior chamber
- Lens
- Vitreous body

OCULAR PHYSIOLOGY

UNIT -III

Protective structure in the eye:

- Orbit and its functions, Eye lid physiology and lacrimal apparatus, Tear film & composition of tears, Tests to assess lacrimal excretory function
- Extrinsic eye muscles, Articulation of eyeball in socket, Mechanics of movement, Control of eye movements
- Diplopia-Diagnosis & assessment ,Measurement of Torsion, Deviation, Field of BSV and field of muscle actions
- Coats of the eye ball
- Cornea Biochemistry, Corneal Transparency, Innervation
- Aqueous humor and vitreous humor- Intra ocular pressure: Maintenance of IOP, Diurnal variations, Measurement of IOP
- Iris and pupil
- Crystalline lens and accommodation Amplitude of accommodation, presbyopia
- Retina structure and functions, Wald's visual cycle.

UNIT -IV

- Visual acuity, Vernier acuity and principle of measurement, Factors affecting vision
- Visual perception Binocular vision, stereoscopic vision, optical illusions
- Stereoscopic acuity, tests for stereopsis, Anomalies of stereopsis.
- Visual pathway- Optic nerve, chiasm & optic tract, Visual deprivation, lesions of pathway
- Scotopic and Photopic vision, Binocular vision, development, theories of fusion

UNIT -V

- Colour vision : Theories and diagnostictests for congenital & acquired colour vision
- Introduction to electro physiology: Electro retinogram, Electro oculogram

REFERENCE BOOKS

- 1. LARemington: Clinical Anatomyof the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.
- 2. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
- 3. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
- 4. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

OCULAR ANATOMY& OCULAR PHYSIOLOGY(PRACTICAL) (UE)

OCULAR ANATOMY

- 1. Orbit: Orbital structure demonstration
- 2. **Eye:** Cadaveric enucleation of eye

OCULAR PHYSIOLOGY

- 1. Lid movements
- 2. Tests for lacrimal secretion
- 3. Extraocular movements
- 4. Anterior segment examination Slit lamp examination
- 5. Pupillary reflexes
- 6. Digital tonometry &Schiotz tonometry
- 7. Measurement of accommodation
- 8. Visual acuity measurement
- 9. Retinoscopy
- 10. Opthalmoscopy
- 11. Binocular vision
- 12. Color vision Testing

GEOMETRICAL OPTICS & PHYSICAL OPTICS- THEORY(UE)

OBJECTIVES: At the end of the course, the student should be able to:

- To equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.
- To equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.
- To equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye
- To predict the basic properties of the images formed on the retina by the optics of the eye

GEOMETRICAL OPTICS

UNIT - I

- Nature of light light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index. Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance
- Refractive index; its dependence on wavelength.
- Fermat's and Huygen's Principle –Derivation of laws of reflection and refraction (Snell's law) from these principles
- Plane mirrors –height of the mirror; rotation of the mirror Reflection by a spherical mirror –paraxial approximation; sign convention; derivation of vergence equation,Imaging by concave mirror, convex mirror,Reflectivity; transmissivity; 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

- UNIT II
 - Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index
 - Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula ,Paraxial approximation; derivation of vergence equation,Imaging by a positive powered surface and negative powered surface
 - Vergence at a distance formula; effectivity of a refracting surface
 - Definition of a lens as a combination of two surfaces; different types of lens shapes.Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths,Newton's formula; linear magnification; angular magnification;Nodal Planes
 - Thin lens as a special case of thick lens; review of sign convention ;Imaging by a thin convex lens; image properties (real/virtual; erect/inverted;magnified/minified) for various object positions
 - Imaging by a thin concave lens; image properties (real/virtual; erect/inverted;magnified/minified) for various object positions.
 - Prentice's Rule
 - System of two thin lenses; review of front and back vertex powers and equivalent magnification formula, power, review of six cardinal points. System of more than two thin lenses; calculation of equivalent power using magnification formula

UNIT - III

- Vergence and vergence techniques revised.
- Gullstrand's schematic eyes, visual acuity, Stile Crawford
- Emmetropia and ametropia,Blur retinal Imaginary,Correction of spherical ammetropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptoric power, angular magnification of spectacles in aphakic
- Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification., Aperture stops- entrance and exit pupils
- Astigmatism. To calculate the position of the line image in a sphero-cylindrical lens.
- Accommodation –Accommodation formulae and calculations
- Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.
- Spatial distribution of optical information- modulation transfer functions- Spatial filteringapplications.
- Visual optics of aphakia and pseudophakia

PHYSICAL OPTICS

UNIT - IV

- 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; polarizers and analyzers; Methods of producing polarized light; Brewster's angle.
- Birefringence; ordinary and extraordinary rays.
- Relationship between amplitude and intensity.
- Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
- Double slits, multiple slits, gratings.

UNIT - V

- 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.
- Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein's theory of lasers. Fluorescence and Phosphorescence
- 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

REFERENCE BOOKS

- 1. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
- 2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
- 3. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
- 4. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.
- 5. Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.
- 6. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
- 7. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

GEOMETRICAL OPTICS & PHYSICAL OPTIC(PRACTICAL)(UE)

- 1. Thick Prism determination of prism angle and dispersive power; calculation of the refractive index
- 2. Thin Prism measurement of deviation; calculation of the prism diopter
- 3. Image formation by spherical mirrors
- 4. Convex lens power determination using lens gauge, power determination using distant object method; power determination using the vergence formula
- 5. Concave lens in combination with a convex lens power determination
- 6. Newton's rings
 - a. Radius of curvature-refractive index of lens
 - b. Refractive index of a liquid
- 7. Demonstration of fluorescence and phosphorescence using crystals and paints
- 8. Air wedge-thickness of a wire (hair)
- 9. Grating-wavelength determination
- 10. Dispersive power of a grating
- 11. Grating minimum deviation & Wavelength determination
- 12. Polarimeter
- 13. Single optic lever
- Spectrometer minimum deviation, Spectrometer I-d curve,: Spectrometer I-I' curve, Spectrometer – narrow angled prism
- 15. Dispersive power of a prism
- 16. Construction of a tabletop telescope all three types oftelescopes.
- 17. Construction of a tabletop microscope

MEDICAL ETHICS AND BIOSAFETY (IE)

UNIT-I

• Definition and key Concepts; philosophical considerations; epistemology of science; ethical terms; principles and theories; relevance to health care; ethics and the law issues: genetic engineering, stem cells, cloning, medical techniques, transhumanism, bio-weapons.

UNIT-II

 Define negligence, malpractice & liability; iatrogenic harm; Influence of ethics in general practice; Describe primary and secondary ethical principles; Hippocrates' oath; Professional codes of ethics; Describe the moral basis of informed consent and advance directives; research ethics – animal rights, ethics of human cloning, and stem cell research; ICMR guidelines.

UNIT-III

• Genetic testing, genetic screening, Fertility and birth control, sex determination and sex selection, Reproductive control: assisted reproduction and ethics, pre-natal genetic counseling, pre-implantation genetic diagnosis, Ethical issues in applied medicine; Workers compensation.

UNIT-IV

 Euthanasia and physician-assisted dying; end-of-life care; Physicians, patients and other: autonomy, truth telling & confidentiality; emerging issues: impact of medical advances on society; Use of genetic evidence in civil and criminal court cases; Challenges to public policy – to regulate or not to regulate; improving public understanding to correct misconceptions.

UNIT-V

• Introduction to Biosafety; biological safety cabinets; containment of biohazard; precautions for medical workers; precautions in patient care; Biosafety levels of microorganisms; mitigation of antibiotic resistance; radiological safety; measurement of radiation; guidelines for limiting radiation exposure; maximum reasonable dose; precautions against contamination; Institutional Biosafety committee.

TEXT BOOKS:

1. Medical Ethics - CM Francis 2e, Jaypee publishers, India (2004)

2. Medical Law, ethics, and bioethics - M Lewis and C Tamparo, 4e. FA Davis publishers (1998)

3. Biomedical ethics - Terry O' Neill, Greenhaven Press (1999)

REFERENCE BOOKS:

1. Human factor, a bridge between care and cure, eds. R Tartaglia, S Bagnaro et al. Taylor and Francis(2005)

2. Medical Ethics - Robert Snedden, Steck-Vaughn Publishers, Texas, USA (2000

PSYCHOLOGY (IE)

UNIT 1: Basic Concepts of Psychology

 Definition of Psychology, Origin of Psychology - Philosophical roots of psychology, Schools of Psychology –Structuralism – Gestalt – Functionalism – Behaviorism -Psychoanalysis – Humanistic. Fields of Psychology - Work of a psychologist – Applications of psychology.

UNIT 2: Learning principles and methods

 Definition of learning, Factors In The Process of Learning Classical conditioning -Operant Conditioning – The principle of reinforcement and Punishment. Theory of learning.Cognitive learning- Latent learning, Insight learning, and Imitation.

UNIT 3: Motivation, Emotion, Memory and forgetting

 Motivation - Definition of motivation – Theories of motivation - Physiological basis of motivation – Motivational factors in aggression – Self-actualization motivation. Emotion – Emotional expression –Theories of emotions. Kinds of remembering – Retrieval processes – The nature of forgetting – Two process theories of memory – Improving memory –Language and thought – Symbols and concepts – Structure – Forms of thought - Thinking and reasoning – Concept formation.

UNIT 4: Development, Sensory Processes and Perception.

 Erikson's stages of psychosocial development Lawrence Kohlberg's stages of moral development Freud's Stages of Psychosexual Development Physiological basis of behavior – The brain and nervous system –The sensory process, Some general characteristic of senses – Five senses, Perception: Organization – The role of learning in perception – Perception and attention – Perceptual process.

UNIT 5: Intelligence & Personality

 Theories of intelligence – Measuring Intelligence – Kinds of intelligence tests – Ability – Formation of aptitude and attitude – Aptitude tests –Creativity and its tests.
Personality – Definition of Personality – Theories of Personality – Assessment of Personality.Social Factors Influencing Personality.

UNIT 6: Social Psychology

 Definition, Nature, Subject Matter and Scope Of Social Psychology-Applications and Importance of Social Psychology, Groups: Definition and Type- Primary And Secondary Groups Social Interaction, Social and Inter-Personal Relations. Interpersonal attraction – Love and Companionship.Prosocial-behavior. Modes of empathy: self – other differentiation and development of empathy. Social influence: attitude and conformity. Definition - Characteristics and Classification of Crowd. Leadership: Definition and characteristics, Defense Mechanisms, frustration and conflict, sources of frustration and conflict, types of conflicts. Aggression and Types of aggression.

UNIT 7: Health Psychology

- Definition of Health Psychology -Relating Health Psychology to other fields Clinical Health Psychology, Public Health Psychology, Community Health Psychology, Critical Health Psychology
- Abnormal Psychology: Concepts of normality and abnormality, causation of mental illness, neuroses, psychoses, psychosomatic disorders, measures to promote mental health.
- Stress Definitions- Models of Stress Theories of Stress Stress reactions Coping and Stress Management techniques, Pain and its management – Psychological reactions of a patient to loss – Stages of Acceptance by Kubler-Ross.

REFERENCES:

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler, "Introduction to Psychology" – 7th Edition. Tata McGraw Hill Book Co. New Delhi, 1993.

2. Baron, R. A., & Byrne, D (2006), "**Social psychology**", New Delhi: Prentice hall of India private limited.

3. Elliot Aronson, Timothy D. Wilson, Robin M. Akert, Samuel R. Sommers, **"Social psychology"** 9th edition published by Pearson education, Inc.,2006

4. Shelley E. Taylor. "**Health Psychology**"**Third Edition**.McGraw Hill International Editions, 1995.

5. Swaminathan, V.D, LathaSathish, "**Psychology for Effective Living**", Department of Psychology, University of Madras.

6. Coleman, James. 1980. "Abnormal Psychology and modern life". New Delhi: Tata McGraw Hill Ltd.

CLINICS - I (IE)

A Logbook is maintained with case sheets of complete management and follow-

ups:

- Role Play (Patient- Optometrist)
- Clinical Observation and Report Writing
- Vision Check (Snellen's Chart) Distance + Near
- History taking
 - o General
 - Specific
 - Conditions
- Vision Check(log MAR)
- Pinhole acuity

SEMESTER-IV

S.NO	SUBJECT
1	Visual Optics I &II (Theory) (UE)
2	Optometric Optics I & II And Dispensing Optics (Theory) (UE)
3	Visual Optics I & II And Dispensing Optics (Practical) (UE)
4	Optometric Instruments (Theory) (UE)
5	Clinical Examination Of Visual System(IE)
6	Nutrition(IE)
7	Clinics - II(IE)
<u>SEMESTER - IV</u> <u>VISUAL OPTICS I & II THEORY(UE)</u>

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

- 1. To understand the fundamentals of optical components of the eye
- 2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.
- 3. To concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

VISUAL OPTICS I

UNIT -I

Reviewof Geometrical Optics: Vergenceandpower

- Conjugacy, object space and image space
- Sign convention
- Spherical refracting surface
- Spherical mirror; catoptric power
- Cardinal points
- Magnification
- Light and visual function
- Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism
- Aberration and application Spherical and Chromatic

UNIT -II

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

UNIT –III

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

VISUAL OPTICS II

UNIT -IV

Accommodation & Presbyopia

- Far and near point of accommodation
- Range and amplitude of accommodation
- Mechanism of accommodation
- Variation of accommodation with age
- Anomalies of accommodation

- Presbyopia
- Hypermetropia and accommodation

Convergence:

- Type, Measurement and Anomalies
- Relationship between accommodation and convergence-AC/Aratio

Objective Refraction (Static & Dynamic)

- Streak retinoscopy
- Principle, Procedure, Difficulties and interpretation offindings
- Transposition and spherical equivalent
- Dynamic retinoscopy various methods
- Radical retinoscopy and near retinoscopy
- Cycloplegic refraction

UNIT -V

Subjective Refraction:

- Principle and fogging
- Fixedastigmaticdial(Clockdial),Combinationoffixedandrotatordial(Fanand block test),J.C.C
- Duochrome test
 - Binocular balancing- alternate occlusion, prism dissociation, dissociate
 Duochrome balance, Borish dissociated fogging
 - o Binocular refraction-Various techniques

Effective Power & Magnification :

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

REFERENCE BOOKS:

- 1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
- AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998
- 3. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
- 4. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
- H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
- WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006
- Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
- 8. Duke –Elder's practice of Refraction
- AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006
- George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002
- Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth Heinemann, 2002
- David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth Heinemann, 2007
- WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

OPTOMETRIC OPTICS I & II AND DISPENSING OPTICS: THEORY(UE)

Objectives:

Skills/knowledge to be acquired at the end of this course:

- Measurement of lens power , lens centration using conventional techniquesand Transposition of various types of lenses Knowledge to identify different forms of lenses (equi- convex, planoconvex, periscopic, etc.)
- Knowledge to select the tool power for grinding process and Measurement of surface powers using lens measure ,Method of laying off the lens for glazing process and Ophthalmic prism knowledge effects, units, base-apex notation, compounding and resolving prisms.
- Knowledge of prism and decentration in ophthalmic lenses and different types of materials used to make lense and lens designs single vision, bifocals, progressive lens, tinted and protective lenses, progressive lens fitting and solving of trouble shooting ,special lenses like iseikonic, spectacle magnifiers, spectacle frames manufacture, materials
- Knowledge to deal with the dispensing aspects of spectacle lenses and frames needed to manage the customer in an Optical set up, from counseling to delivering the spectacles

OPTOMETRIC OPTICS I

UNIT -I

- Introduction –Light, Mirror, Reflection, Refraction and Absorption
- Prisms –Definition, properties, Refraction through prisms, Thickness difference, Baseapex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms
- 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, decentration and Prentice rule, Prismatic effect of Planocylinder and Spherocylinderlenses
- 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

OPTOMETRIC OPTICS II

UNIT -II

Spectacle Lenses - II:

- Manufacture of glass
- Lens materials
- Lens surfacing
- Principle of surface generation and glass cements
- Terminology used in Lens workshop
- Lens properties
- Lens quality
- Faultsinlensmaterial
- Faults on lens surface
- Methods of Inspecting the quality of lenses
- Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)

Spectacle Frames:

- Types and parts
- Classification of spectacle frames-material, weight, temple position, Coloration
- Frame construction
- Frame selection
- Size, shape, mounting and field of view of ophthalmic lenses

Tinted & Protective Lenses

UNIT -III

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

Multifocal Lenses:

- Introduction, history and development, types
- Bifocal lenses, Trifocal & Progressive additionlenses

Reflection from spectacle lens surface & lens coatings:

- Reflection from spectacle lenses ghost images Reflections in bifocals at the dividing line
- Antireflectioncoating, Mirrorcoating, Hard Multi Coating[HMC], Hydrophobic coating

Miscellaneous Spectacle:

- Iseikonic lenses
- Spectacle magnifiers
- Recumbent prisms
- Fresnel prism and lenses
- Lenticular & Aspherical lenses

High Refractive index glasses

DISPENSING OPTICS

UNIT - IV

- Frame measurements
- Instrumentation Pupillometer ,Pliers,PCD,Air blower,Distometer
- Measuring Inter-pupillary distance (IPD) for distance & near
- Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments –facial wrap, pantoscopic tilt
- Frame types & selection –based on spectacle prescription, professional requirements, age group, face shape
- Components of spectacle prescription & interpretation, transposition, Add and near
- power relation
- Recording and ordering of lenses (power, add, diameter, base, material, type, lens
- enhancements)
- Neutralization Hand &lensometer, axis marking, prism marking
- Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)

UNIT -V

- 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 purpose frames
- Safety Eye wear
- Frame availability in Indian market
- FAQ's by customers and their ideal answers.

REFERENCE BOOKS:

- 1. Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.
- 2. David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999
- 3. C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996
- 4. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth Heinemann, 2008
- 5. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth Heinemann, 1996
- C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth -Heinemann, 2007
- Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth Heinemann, 2002

VISUAL OPTICS I& II AND DISPENSING OPTICS PRACTICAL-(UE)

VISUAL OPTICS –I & II

- Study of Purkinje images I and II
- Measurement of corneal curvature
- Mathematical models of the eye –emmetropia
- Mathematical models of Hypermetropia
- Mathematical models of myopia
- Conjugate points demonstration worked examples
- Axial and refractive hyperopia worked examples
- Axial and refractive myopia worked examples
- Visual acuity Measurement
- Effect of lenses in front of the eye
- Effect of prisms in front of the eye
- Vision through pinhole, slit, filters, etc
- Visual acuity, stereo acuity in emmetropic
- Presbyopic correction and methods: accommodative reserve, balancing the relative accommodation and cross grid test
- Methods of differentiating axial and refractive ametropia
- Practice of Retinoscopy Emmetropia
- Practice of Retinoscopy Spherical ametropia
- Practice of Retinoscopy Simple astigmatism
- Practice of Retinoscopy Compound hyperopia
- Practice of Retinoscopy Compound myopia
- Practice of Retinoscopy Oblique astigmatism
- Practice of Retinoscopy in media opacities
- Practice of Retinoscopy Aphakic
- Practice of Retinoscopy in irregular astigmatism
- Practice of Retinoscopy in strabismus and eccentric fixation
- Interpretation of cycloplegicretinoscopic findings
- Measurement of accommodation- near and far points and range
- Measurement of Convergence
- Prescription writing
- Vision therapy

DISPENSING OPTICS

- Optic center marking
- PD Measurement for far and near
- Pupilliometer
- Tints and filters to be shown indications
- Different types of Bifocals to be shown
- PALs fitting

OPTOMETRIC INSTRUMENTS- THEORY(UE)

OBJECTIVES:

Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments

- Visual Acuity chart/drum,Retinoscope,Trail Box,Jackson Cross cylinder,Direct ophthalmoscope .Slit lamp Biomicroscope and Ophthalmoscopy (+90, 78 D)
- Gonioscope, Tonometer: Applanation Tonometer and Keratometer
- Perimeter, Electrodiagnostic instrument (ERG, VEP, EOG), A Scan Ultrasound and Lensometer

UNIT -I

Refractive instruments

- Visual acuity measurement-standard test chart includes CSM, Lea Paddles, Pediatric charts, Snellen and Logarithmic charts
- Trial case lenses and Trial frame- types available
- Refractor (phoropter)
- Retinoscope types available

UNIT -II

- Brightness acuity test
- Vision analyzer
- Pupilometer
- Potential Acuity Meter

UNIT -III

Ophthalmoscopes and related devices

- Direct and Indirect Ophthalmoscope
- Design of ophthalmoscopes illumination, viewing

Nerve Fiber Analyser

• OCT

UNIT –IV

- Lensometry
- Slit lamp Bimicroscopy
- Tonometry
- Placido's disc
- Keratometry
- Corneal topography

UNIT -V

- Orthoptic Instruments-Synaptophore, Home therapy systems
- Color Vision Testing Devices
- Fields of Vision And Screening Devices
- Fundus camera
- Ophthalmic Ultrasonography and Imaging –A-scan, B-scan, Optical Coherence Tomography
- Electro diagnostics Electroretinogram(ERG), Electrooculogram(EOG), Visual evoked potentials(VEP)

REFERENCE BOOKS:

- 1. David Henson: Optometric Instrumentations, Butterworth-Heinnemann, UK, 1991
- 2. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002
- 3. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

CLINICAL EXAMINATION OF THE VISUAL SYSTEM THEORY(IE)

OBJECTIVES:

- At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings
- Interpretation of the findings of the various clinical optometry procedure
- This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuroophthalmic examination, paediatric optometry examination, and Glaucoma evaluation
- This course deals with the concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

UNIT -I

- History taking
- Visual acuity estimation
- Extraocular motility, Cover teat, Alternating cover test
- Hirschberg test, Modified Krimsky
- Pupils Examination
- Maddox Rod

UNIT -II

- Van Herrick Grading
- External examination of the eye, Lid Eversion
- Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),
- Color Vision
- Stereopsis

UNIT -III

- Confrontation test
- Photostress test
- Slit lamp biomicroscopy
- Ophthalmoscopy

UNIT -IV

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

TEXT BOOK:

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

NUTRITION-THEORY (IE)

OBJECTIVES:

At the end of the course student would have gained the knowledge of the following:

- To diagnose various nutritional deficiencies
- Provide health education base on the client deficiencies
- Identify condition and plan for Balanceddiet.
- Protein, carbohydrates, vitamins, Minerals, carotenoidsandeye.
- Nutrition and Ocular aging and Adverse effects of ocular nutritional supplements.

UNIT-I

Introduction.

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

UNIT-II

Energy

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

UNIT-III

Proteins

- Sources and functions
- Essential and non- essential amino- acids.
- Incomplete and complete proteins
- Supplementary foods.
- PEM and theeye
- Nitrogen balance
- Changes in protein requirement.

UNIT-IV

Fats

- Sources and functions
- Essential fatty acids
- Excess and deficiency
- Lipids and the eye.
- Hyperlipidemia, heart diseases, atherosclerosis

Minerals

- General functions and sources
- Macro and micro minerals associated with the eye.
- Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)

UNIT-V

Vitamins

- General functions, and food sources
- Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A
- Promoting sound habits in pregnancy, lactation and infancy.
- Nutrient with antioxidant.
- Properties
- Digestion of Proteins, carbohydrates & lipids

Essential amino acids.

Miscellaneous

• Measles and associated eye disorders, low birthweight

TEXT BOOK:

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

CLINICS - II (IE)

A Logbook is maintained with case sheets of complete management and follow-ups:

- 1. Extraocular Motility
- 2. Cover test
- 3. Alternate Cover test
- 4. Hirschberg test
- 5. Modified Krimsky test
- 6. Push up test (Amplitude of Accommodation)
- 7. Push up test (Near point of Convergence)
- 8. Negative Relative Accommodation
- 9. Positive Relative Accommodation
- 10. Maddox rod (Phoria)
- 11. Negative Fusional vergence
- 12. Positive Fusional Vergence
- 13. Stereopsis test
- 14. Tear Break up time
- 15. Amsler's Grid test
- 16. Photostress test
- 17. Color vision test
- 18. Schirmer's test
- 19. Confrontation test
- 20. Lensometry

SEMESTER-V

S.NO	SUBJECT
1	Ocular Diseases - I (Theory) (UE)
2	Ocular Diseases- II & Glaucoma (Theory) (UE)
3	Low Vision And Contact Lens (Theory) (UE)
4	Low Vision And Contact Lens (Practical) (UE)
5	Systemic Diseases (IE)
6	Special Clinics – I (IE)
7	Biostatistics and Research Methodology(IE)
8	Environmental Science And Community Medicine (Elective) /Advanced Diagnostics techniques(Elective) (IE)

<u>SEMESTER –V</u> OCULAR DISEASES I THEORY(UE)

OBJECTIVES:

At the end of the course the students will be knowledgeable in the following aspects of ocular diseases:

- knowledge on the etiology, epidemiology, symptoms, signs, course sequelae of ocular disease
- knowledge on the diagnostic approach, and management of the ocular diseases

UNIT -I

Orbit

- Applied Anatomy
- Proptosis (Classification, Causes, Investigations)
- Enophthalmos
- Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)
- Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)
- Grave's Ophthalmopathy
- Orbital tumors(Dermoids, capillary haemangioma, Optic nerve glioma)
- Orbital blowout fractures
- Orbital surgery (Orbitotomy)
- Orbital tumors
- Orbital trauma
- Approach to a patient with proptosis

UNIT -III

Lids

- Applied Anatomy
- Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)

- Oedema of the eyelids(Inflammatory, Solid, Passive edema)
- Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internalhordeolum, Molluscum Contagiosum)
- Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).
- Tumors (Papillomas, 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(Dacryoadenitis)

UNIT -IV

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

Cornea

- Applied Anatomy and Physiology
- Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy

cornea)

• Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative

- Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic))
- Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hassalhenle 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

UNIT -V

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

REFERENCE BOOKS:

- 1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international
- 2. Ltd. Publishers, New Delhi, 2007\Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- 3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth -Heinemann, 2007

OCULAR DISEASES- II & GLAUCOMA (THEORY)

OBJECTIVES:

At the end of the course the students will be knowledgeable in the following aspects of ocular diseases:

- knowledge on the etiology, epidemiology, symptoms, signs, course sequelae of ocular disease
- knowledge on the diagnostic approach, and management of the ocular diseases and glaucoma

UNIT -I

Retina and Vitreous:

- Applied Anatomy
- Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery)
- Inflammatory disorders (Retinitis : Acute purulent, Bacterial, Virus, mycotic)
- Retinal Vasculitis (Eales's)
- Retinal ArteryOcclusion (Central retinal Artery occlusion)
- Retinal Vein occlusion (Ischaemic, Non Ischaemic, Branch retinal vein occlusion)
- Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations
- Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration.
- Retinal Detachement: Rhegmatogenous, Tractional, Exudative)
- Retinablastoma
- Diabetic retinopathy

UNIT -II

Ocular Injuries:

- Terminology: Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury)
- Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis)
- Non Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational)
- Clinical approach towards ocular injury patients

UNIT -III

Lens

- Applied Anatomy and Physiology
- Clinical examination
- Classification of cataract
- Congenital and Developmental cataract
- Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic)
- Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar.
- Management of cataract (Non-surgical and surgical measures; preoperative evaluation, Types of surgeries,)
- Complications of cataract surgery
- Displacement of lens: Subluxation, Displacement
- Lens coloboma, Lenticonus, Microsperophakia.

UNIT -IV

- Anatomy of visual pathway
- Lesions of the visual pathway
- Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robetson pupil, Adie's tonic pupil)
- Optic neuritis, Anterior Ischemic optic neuropathy, Pappilloedema, optic atrophy
- Cortical blindness
- Malingering
- Nystagmus
- Clinical examination

UNIT -V

Glaucoma

- Applied anatomy and physiology of anterior segment
- Clinical Examination
- Definitions and classification of glaucoma

- Pathogenesis of glaucomatous ocular damage
- Congenital glaucoma's
- Primary open angle glaucoma
- Ocular hypertension
- Normal Tension Glaucoma
- Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure)
- Secondary Glaucoma's

Management : common medications, laser intervention and surgical technique

REFERENCE BOOKS:

- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age internationalLtd. Publishers, New Delhi, 2007
- 2. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007

LOW VISION & CONTACT LENS -THEORY(UE)

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

- To understand definition of low vision, epidemiology aspect of visual impairment, And about types of low vision devices and its optical principles and magnification calculation.
- To unable students, understand the clinical approach of the low vision patients and teach students about assistive devices for totally visually challenged,
- To enable students, understand art of prescribing low vision devices and training the low vision patients and other rehabilitation and to understand appropriate referral and follow-up
- The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses and to make students understand the basics of contact lenses.
- To teach about different types of CL design for various kinds of patients, demonstrate various types of fitting, how to identify and manage the adverse effects of contact lens and explain all the procedures to patient

LOW VISION

UNIT –I

- Definitions & classification of Low vision
- Epidemiologyoflowvision
- Modeloflowvisionservice
- Pre-clinical evaluation of low vision patients prognostic & psychological factors; psycho- social impact of low vision
- Types of low vision aids optical aids, non-optical aids & electronic devices
- Optics of low vision aids

UNIT –II

- Clinical evaluation assessment of visual acuity, visual field, selection of low vision aids, instruction & training
- Pediatric Low Vision care
- Low vision aids dispensing & prescribing aspects
- Visual rehabilitation & counseling
- Legal aspects of Low vision in India
- Case Analysis

TEXT BOOKS:

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

CONTACT LENS

UNIT –III

- Introduction to Contact lenses
 - Definition
 - Classification / Types
- History of Contact Lenses
- Optics of Contact Lenses
 - Magnification & Visual field
 - Accommodation & Convergence
 - Back & Front Vertex Power / Vertex distance calculation
- Review of Anatomy & Physiology of
 - Tear film
 - o Cornea
 - Lids & Conjunctiva
- Introduction to CL materials
 - Monomers, Polymers
 - Properties of CL materials
 - Physiological (Dk, Ionicity, Water content)
 - Physical (Elasticity, Tensile strength, Rigidity)
 - Optical (Transmission, Refractive index)

UNIT –IV

- Indications and contraindications
- Parameters / Designs of Contact Lenses & Terminology
- RGP Contact Lens materials
- Manufacturing Rigid and Soft Contact Lenses various methods
- Pre-Fittingexamination- steps, significance, recordingofresults
- 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

UNIT –V

- Calculation and finalising Contact lens parameters
- Ordering Rigid Contact Lenses writing a prescription to the Laboratory
- Checking and verifying Contact lenses from Laboratory
- Modifications possible with Rigid lenses
- Common Handling Instructions
 - Insertion & Removal Techniques
 - Do's and Dont's
- Care and Maintenance of Rigid lenses
 - Cleaning agents & Importance
 - Rinsing agents & Importance
 - Disinfecting agents & importance
 - Lubricating & Enzymatic cleaners
- Follow up visit examination
- Complications of RGP lenses

UNIT –VI

- 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
- Calculation and finalising SCL parameters
 - Disposable lenses
 - Advantages and availability
- Soft Toric CL
 - Stabilization techniques
 - Parameter selection
 - Fitting assessment
- Common Handling Instructions
 - Insertion & Removal Techniques
 - Do's and Dont's
- Careand Maintenance of Softlenses
 - Cleaning agents & Importance
 - Rinsing agents & Importance
 - Disinfecting agents & importance
 - Lubricating & Enzymatic cleaners
 - Follow up visit examination, Complications of Soft lenses
- Therapeutic contact lenses
 - Indications
 - Fitting consideration
- Specialty fitting
 - o Aphakia
 - Pediatric
 - Post refractive surgery
- Management of Presbyopia with Contact lenses

TEXT BOOKS:

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

LOW VISION AND CONTACT LENS (PRACTICAL) (UE)

LOW VISION

- 1. Practical 1: Attending in low vision care clinic: History taking, Refraction and other supportive tests
- 2. Practical 2:
 - 2.1 Demonstration of Optical, non-optical & electronic devices
 - 2.2 Determining the type of telescope and its magnification (Direct comparison method & calculated method)
 - 2.3 Determining the change infield of view with different magnification and different eye to lens distances with telescopes and magnifiers.
- 3. Practical 3:
 - 3.1 Inducing visual impairment and prescribing magnification.
 - 3.2 Determining reading speed with different types of low vision aids with same magnification.
 - 3.3 Determining reading speed with a low vision aid of different magnifications.

CONTACT LENS :

- 1. History taking
- 2. Measurement of Ocular dimensions
- 3. Pupillary diameter and lid characteristics
- 4. Blink rate and TBUT
- 5. Schrimers test, Slit lamp examination of tear layer
- 6. Keratometry and Placido's disc
- 7. Specular microscopy & Pachymetry
- 8. Soft Contact Lens fitting
- 9. RGP Lens fitting
- 10. RGP Lens Fit Assessment and fluorescein pattern
- 11. Specialty Contact Lens fitting –Aphakia, Pediatric, Keratoconus
- 12. Bandage Contact lens
- 13. Slit lamp examination of Contact Lens wearers
- 14. Lensinsertionand removal
- 15. Lens handling and cleaning
- 16. Examination of old soft and RGP Lenses

SYSTEMIC DISEASES THEORY(IE)

COURSE OBJECTIVES:

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

- To have an understanding of various systemic diseases that all affect the eyes
- To have an understanding of the ocular side effects of various drugs that are used to manage or treat systemic diseases
- To understand the role of an optometrists for co management of and systemic diseases with other health care profession
- Common Systemic conditions: Definition, diagnostic approach, complications and management options
- Ocular findings of the systemic conditions and First Aid knowledge

UNIT –I

Hypertension

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

Diabetes Mellitus

- Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications
- Diabetic Retinopathy

Thyroid Disease

- Physiology, testing forthyroiddisease, Hyperthyroidism, Hypothroidism, Thyroiditis, Thyroid tumors
- Grave's Ophthalmopathy

UNIT –II

Acquired Heart Disease

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

Cancer :

- Incidence
- Etiology
- Therapy
- Ophthalmologic considerations

UNIT –III

Connective Tissue Disease

- Rheumatic arthritis
- Systemic lupus erythematosus
- Scleroderma
- Polymyositis and dermatomyositis
- Sjogren syndrome
- Behcet's syndrome
- Eye and connective tissue disease

Tuberculosis

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

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

• Herpes and the eye

Hepatitis (Hepatitis A, B, C)

Acquired Immunodeficiency Syndrome

Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment,

Ophthalmologic considerations)

UNIT –IV

Common Tropical Medical Ailments

- Malaria
- Typhoid
- Dengue
- Filariases
- Onchocerciasis
- Cysticercosis
- Leprosy

Nutritional and Metabolic disorders:

- Obesity
- Hyperlipidaemias
- Kwashiorkor
- Vitamin A Deficiency
- Vitamin D Deficiency
- Vitamin E Deficiency
- Vitamin K Deficiency
- Vitamin B1,B2, Deficiency
- Vitamin C Deficiency

UNIT –V

Myasthenia Gravis

First Aid

- General Medical Emergencies
- Preoperative precautions in ocular surgeries

Psychiatry

• Basic knowledge of psychiatric condition and Patient Management

Genetics

- Introduction to genetics
- Organisation of the cell
- Chromosome structure and cell division
- Gene structure and basic principles of Genetics.
- Genetic disorders and their diagnosis.
- Genes and the eye
- Genetic counseling and genetic engineering.

TEXT BOOKS:

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

SPECIAL CLINICS - I (IE)

A Logbook is maintained with case sheets of complete management and follow-ups:

- 1. Slit lamp examination
- 2. Finger tension
- 3. Schiotz Tonometry
- 4. Applanation Tonometry
- 5. Von Herick Grading of Anterior chamber depth
- 6. Accommodative facility($\pm 2.00 \text{ D}$)
- 7. Corneal Sensitivity test
- 8. IPD
- 9. Proptosis evaluation
- 10. Ptosis evaluation
- 11. Pupillary evaluation
 - Direct
 - Consensual
 - RAPD
- 12. HVID
- 13. Retinoscopy- Static, Dynamic and Cycloplegic Retinoscopy
- 14. Keratometry
- 15. Subjective Refraction
- 16. JCC
- 17. Clock Dial
- 18. Duochrome
- 19. Borish Delayed
- 20. Addition calculation

SEMESTER-V BIOSTATISTICS & RESEARCH METHODOLOGY(ELECTIVE) (IE)

INTRODUCTION

What is statistics – Importance of statistics in behavioral sciences – Descriptive statistics and inferential statistics – Usefulness of quantification in behavioral sciences. Measurements – Scales of measurements – Nominal, Ordinal, Interval and Ratio scales. Cumulative frequency curve – Drawing inference from graph. Measures of central tendency – Need – types: Mean, Median, Mode – Working out these measures with illustrations. Measures of variability – Need – Types: Range, Quartile deviation, Average deviation, Standard deviation, Variance – Interpretation. Normal distribution – General properties of normal distribution – Theory of probability – Illustration of normal distribution – area under the normal probability curve.

Variants from the normal distribution – skewness – Quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.

RESEARCH METHODS:

Research Meaning- Scope and Objectives –.Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis

DATA COLLECTION AND SAMPLING:

Data collection – Classification of data – Class intervals – Continuous and discrete measurements – Drawing frequency polygon – types of frequency polygon – Histogram. Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, etc.), hypothesis testing.Correlation – historical contribution – meaning of correlation – types: Product, moment, content correlation, variation of product, movement correlation, rank correlation, Regression analysis.

Tests of significance- need for – significance of the mean – sampling error – significance of differences between means – interpretation of probability levels – small samples – large samples.
ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE

Natural Resources:

Introduction, Multi-disciplinary nature of environmental studies, Earth Resources and Man, Renewable And Non-Renewable Resources, Water Resources, Mineral Resources: Food Resources: Effects of modern agriculture, Fertilizer/ pesticide problems, Water logging, and salinity, Energy Resources.

Ecosystems:

Concept of an Ecosystem, Structure And Functions of an Ecosystem, Producers, Consumers and Decomposers, Cycles in The Ecosystem

Biodiversity:

Introduction, Definition: Genetic, Species, Ecosystem Diversity, India as a Mega Diversity Nation, Hotspots of Biodiversity Threats to Biodiversity. Poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic

Pollution:

Definition, Causes, Effects and Control Measures of Air Pollution, Water Pollution, Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards, Solid Waste Management role of Individuals in Pollution Prevention. Social Issues Human, Population and Environment:

From Unsustainable To Sustainable Development, Urban Problems Related to Energy, Water Conservation, Rain Water Harvesting, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust

<u>Concept of health & disease</u>

Concept of health, Definition of health, Philosophy of health-Dimension of health - Concept of well being, Spectrum of health, Responsibility of health - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Modes of Intervention, Changing pattern of disease.

Epidemiology:

Definition & Explanation, Aims, Epidemiologic approach, Basic measurement in epidemiology & tools of measurement – of Mortality, Epidemiologic methods – Descripitive epidemiology – Analytical epidemiology -Cohort study – Expiremental epidemiology – RCT- Association & Caution Uses of epidemiology (Criteria for judging causality) – Infection disease epidemiology Definitions Dynamic of disease transmission & Mode of Transmission – Disinfection – Definitions Types Agents

used Recommended disinfection procedures – Investigation of anepidemic.

Environmental &health:

Definition & Components (environment sanitation environmental sanitation) Water: Safe & Whole some water Requirements Uses source of water supply (sanitary well) – Purification (1).Large scale purification, (2). Small scale purification – Water quality – Special treatment of water Air: Composition the air of

ADVANCED DIAGNOSTIC TECHNIQUES (ELECTIVE)

<mark>Unit I</mark>

Volumetricanalysis,Balancing&Weighing,Conceptofsolute&solvent,Unitsofmea surement. Specimen Collection & Processing: Specimen collection (Blood, urine, spinal fluid, saliva synovial fluid, Amniotic fluid),

Preservation, transportation

<mark>Unit II</mark>

Clinical Enzymology: Principle of diagnostic enzymology, Digestive enzyme, miscellaneous enzyme. General Function Tests: Liver function test, Cardiac Function Test, Renal Function Test, Thyroid Function test, Reproductive endocrine function test

<mark>Unit III</mark>

Immunodiagnostics: Introduction, Antigen-Antibody Reactions, Conjugation Techniques, Antibody Production, Enzymes and Signal Amplification Systems, Separation and Solid-Phase Systems, Studies related to bacterial, viral and parasitic infections.

<mark>Unit IV</mark>

Product Development: Immunoassay Classification and Commercial Technologies, Assay

Development,Evaluation,andValidation,ReagentFormulationsandShelfLifeEv aluation,Data Analysis, Documentation, Registration, and DiagnosticsStart-Ups.

<mark>Unit V</mark>

DNA based diagnostics: PCR, RFLP, SSCP, Microarrays, FISH, In-situ hybridization, Studies related to bacterial, viral and parasitic infections, Cell based diagnostics: Antibody markers, CD Markers, FACS, HLA typing, Bioassays.

SEMESTER - VI

S.NO	SUBJECT
1	Occupational Optometry & Public Health And Community Optometry- Theory (UE)
2	Geriatric Optometry & Paediatric Optometry - Theory (UE)
3	Binocular Vision I & II- Theory (UE)
4	Binocular Vision I & II – Practical (UE)
5	Sports Vision (IE)
6	Special Clinics – II (IE)
7	Hospital Management/Applied Clinical Research(Elective)

SEMESTER – VI

OCCUPATIONAL OPTOMETRY&

PUBLIC HEALTH AND COMMUNITY OPTOMETRY -THEORY(UE)

OBJECTIVES:

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

- To enable students, understand general aspects of occupational health.
- To teach visual demand in various job, task analyzing method, visual standards for various jobs.
- To enable them understand various occupational hazards and remedial aspects through classroom sessions and field visit to the factories.
- Knowledge in Community based eye care in India and Prevalence of various eye diseases
- Developing Information Education Communication materials on eye and vision care for the benefit of the public ,organize health education programmes in the community and Vision screening for various eye diseases in the community and for different age groups.

OCCUPATIONAL OPTOMETRY

UNIT –I

- Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc.
 - Acts and Rules Factories Act, WCA, ESIAct.
- Electromagnetic Radiation and its effects on Eye
- Light Definitions and units, Sources, advantages and disadvantages, standards
- Color Definition, Color theory, Color coding, Color defects, Color Vision tests
- Occupational hazards and preventive/protective methods

UNIT –II

- Task Analysis
- Industrial Vision Screening Modified clinical method and Industrial Vision test
- Vision Standards Railways, Roadways, Airlines
- Visual Display Units
- Contact lens and work

PUBLIC HEALTH AND COMMUNITY OPTOMETRY -THEORY(UE)

UNIT –III

- Public Health Optometry: Concepts and implementation, Stages of diseases
- Dimensions, determinants and indicators of health
- Levels of disease prevention and levels of health carepatterns
- Epidemiology of blindness Defining blindness and visual impairment
- Eye in primary health care
- Contrasting between Clinical and community health programs
- Community Eye Care Programs

UNIT –IV

- Community based rehabilitation programs
- Nutritional Blindness with reference to Vitamin A deficiency
- Vision 2020: The Right to Sight
- Screening for eye diseases
- National and International health agencies, NPCB
- Role of an optometrist in Public Health

UNIT –V

- Organization and Management of Eye Care Programs Service Delivery models
- 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

REFERENCE BOOKS:

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

GERIATRIC OPTOMETRY & PAEDIATRIC OPTOMETRY-THEORY(UE)

COURSE OBJECTIVES:

Upon completion of the course, the student should be able:

- To practice skills in pediatric and geriatric optometric assessments and develop effective clinical management
- To develop clinical competence in analysis, evaluation and management of pediatric and geriatric population.
- To meet the challenge of pediatric and geriatric eye care and vision• rehabilitation through clinical placemen.

GERIATRIC OPTOMETRY:

UNIT –I

- Structural, and morphological changes of eye inelderly
- 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)

UNIT –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 ingeriatrics.
- Spectacle dispensing in elderly Considerations of spectacle lenses and frames

PEDIATRIC OPTOMETRY:

UNIT –III

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

UNIT –IV

- Refractive Examination
- Determining binocular status
- Determining sensory motor adaptability
- Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia

UNIT –V

- 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 lenses
- Low vision assessment in children

REFERENCE BOOKS:

- 1. Pediatric Optometry JEROME ROSNER, Butterworth, London 1982
- Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004
- 3. A.J. ROSSENBLOOM Jr & M.W.MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.
- OP Sharma: Geriatric Care A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
- 5. VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
- 6. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

BINOCULAR VISION I&II THEORY(UE)

OBJECTIVES:

- This course provides theoretical aspects of Binocular Vision and its clinical application.. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extraocular muscles.
- To teach various binocular vision anomalies, its diagnostic approache and management.
- To enable students, understand classification of strabismus, its etiology signs and symptoms, necessary Orthoptic investigations, diagnosis and non-surgical management.
- To inculcate the knowledge of different types of strabismus its etiology signs and symptoms, necessaryinvestigations and also management.
- To perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

UNIT –I

Binocular Vision and Space perception.

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

UNIT –II

Anatomy of Extra Ocular Muscles.

- Rectii and Obliques, LPS.
- Innervation & Blood Supply.

Physiology of Ocular movements.

- Center of rotation, Axes of Fick.
- Action of individual muscle.

Laws of ocular motility

- Donder's and Listing's law
- Sherrington's law
- Hering's law

Uniocular & Binocular movements - fixation, saccadic & pursuits.

- Version &Vergence.
- Fixation & field of fixation

Near Vision Complex Accommodation

- Definition and mechanism (process).
- Methods of measurement.
- Stimulus and innervation.
- Types of accommodation.
- Anomalies of accommodation aetiology and management.

UNIT –III

Convergence

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

Sensory adaptations

• Confusion

Suppression

- Investigations
- Management
- Blind spot syndrome

Abnormal Retinal Correspondence

- Investigation and management
- Blind spot syndrome

Eccentric Fixation

• Investigation and management

Amblyopia

- Classification
- Aeitiology
- Investigation
- Management

BINOCULAR VISION- II

UNIT –IV

- Neuro-muscular anomalies
 - Classification and etiological factors
- History recording and significance.
- Convergent strabismus
 - o Accommodative convergent squint
 - Classification
 - Investigation and Management
 - Non accommodative Convergent squint
 - Classification
 - Investigation and Management
- Divergent Strabismus
 - Classification
 - A& V phenomenon
 - Investigation and Management
 - Vertical strabismus
 - Classification
 - Investigation and Management
- Paralytic Strabismus
 - Acquired and Congenital
 - Clinical Characteristics

UNIT –V

- Distinction from comitant and restrictive Squint
- Investigations
 - History and symptoms
 - Head Posture
 - Diplopia Charting
 - o Hess chart
 - o PBCT
 - Nine directions
 - Binocular field of vision
- Amblyopia and Treatment of Amblyopia
- Nystagmus
- Non-surgical Management of Squint
- Restrictive Strabismus
 - Features
 - Musculo-fascical anomalies
 - Duane's Retraction syndrome
 - Clinical features and management
 - o Brown's Superior oblique sheath syndrome
 - Strabismus fixusz
- Surgical management

TEXT BOOKS:

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

BINOCULAR VISION I&II (PRACTICAL)(UE)

PRACTICAL:

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

- 1. Diplopia Charting
- 2. Hess Charting
- 3. Prism Trial (Ground prism, Fresnel Prism, Yoke Prism)
- 4. Vision Therapy

ORTHOPTICS

- 1. Stereopsis- (Global and Local)
- 2. Worth four dot test (Distance and Near)
- 3. Maddox rod, wing,
- 4. Cover test (Cover, Uncover, Alternate cover)
- 5. PBCT (Prism bar cover test)
- 6. Thorington
- 7. AC/A ratio (Heterophoria method/ Gradient method)
- 8. NPC (Accommodative target & amp; Red/Green filter)
- 9. NPA (OD, OS, OU)
- 10. MEM (Monocular Estimation Method)
- 11. NRA
- 12. PRA
- 13. NFV & amp; PFV (Distance), NFV & amp; PFV (Near)
- 14. Vergence facility (12BO & amp; 3BI) (Distance and Near)
- 15. Accommodative facility with flippers (+/-2.00 DS, +/-1.50 DS, +/-1.00 DS) (OD, OS, OU)

SPORTS VISION (IE)

OBJECTIVES:

- The subject provides suitable knowledge for students to understand the visual needs of athletes for various kinds of dynamic and static sports, vision training, protective and vision correction options.
- To make students understand the visual demands for various sports activities for athletes
- To make students understand the various visual correction and sports vision training options available to enhance visual skills of athletes
- To make students understand the various kinds of sports injuries and sports protective devices available

UNIT -I

- Principles of Vision Training
- Introduction to Sports Vision- History of Sports Vision, Definitions of Terms
- Vision and Sports- Vision Performance and Athletics
- Equipment List
- Sports Terminologies

UNIT -II

- Sports Vision Examinations- Visual Acuity, High Contrast Refraction, ColorVision, Stereopsis, Dominant Eye / Hand, EyeHealth, CoverTest, OcularMotility, Visual Field, Night Vision, Glare Sensitivity, Glare Recovery
- Visual Skills Description and Training Procedures

UNIT -III

 Accommodation – VergenceFacility, Distance Fixation Disparity, Dynamic Visual Acuity, Eye–Hand Co-ordination, Response Speed, Eye-Foot Co-ordination, Response Speed, Eye-Foot-Body Balance, Peripheral Awareness, Anticipation Timing, Visual Concentration, Speed of Recognition, Visual Concentration, Speed of Recognition, Visual Adjustability, Peripheral Reaction Time, Visualization, Speed of Focusing, Increased Fusional Reserve, Fixation Ability, Visual Memory, Spatial Localization, Visual Skills in Sports and Prescription in the form of vision correction

UNIT -IV

- Designing Sports Vision Programs
- Sports-related Injuries and First Aid
- Post trauma vision syndrome and Visual Midline Shift Syndrome
- Special Concerns Dyslexia, Down's Syndrome
- Orthoptic Evaluation- Identification of sports eye wear for various sports Identification of sports protective devices, Dispensing of various kinds of sports eyewear.

Reference Books:

- 1. Sports Vision by DFC Loran and C J MacEwen Publishers: Butterworth and Heinmann
- 2. Sports Vision by Graham Erickson Publishers: Butterworth and Heinmann

SPECIAL CLINICS II (IE)

A Logbook is maintained with case sheets of complete management and follow-ups:

- 1. Direct ophthalmoscope
- 2. Visual Field chart interpretation
- 3. B scan Interpretation
- 4. A scan chart Interpretation
- 5. Case Analysis
- 6. Gonioscopy
- 7. IDO
- 8. Case Analysis

HOSPITAL MANAGEMENT (ELECTIVE) (IE)

Objectives:

- To promote awareness of health care among all sections of the Indian people
- > To promote awareness among functionaries involved in Health and Hospital Management.
- To promote research in the field of Health and Hospital Management. in order to improve the efficiency of Health Care delivery Systems.
- > To promote the development of high quality hospital services and community health care.
- To promote a forum for the exchange of ideas and information among health and hospital planners, academicians, administrators, various statutory bodies and the general public for the improvement of Hospital and Health Care delivery Systems
- **To develop norms and standards for accreditation of the Health Care Organization and adopt means of evaluation of such institutions, so as to improve the quality of health care in the community**
- To provide opportunities for training and research in all aspects of Hospital Services Health Care Delivery System and Health Care Administration.
- To update the knowledge and skill of the Health & Hospital Administrators and other personnel involved in the management of health care organization through continuous education and research.

UNIT – I

Introduction to Management: Introduction, concept, Characteristics and nature, scope, Principles of Management, Functions and techniques.

<mark>UNIT II</mark>

Planning: Principles, Characteristics, Essential of good planning, advantages and limitations, Classifications.

<mark>UNIT – III</mark>

Staffing: Importance, Norms and activities, PCS, Types of PCS, Duty Roaster. Human resource management: HR planning, Recruitment, selection process, Placement, Orientation of new staff and training, Staff development, staff promotion.

UNIT – IV

Budgetting and material management: Purpose, Types, Principles, Function, cost benefit analysis, Auditing. Principles of MM, process, supply and equipment, Inventory control, Procurement.

<mark>UNIT- V</mark>

Controlling-Quality management: Essential of effective control system, Importance of controlling, **TQM**. Hospital and patient care, ward management. Legal Issues.

<mark>UNIT - VI</mark>

Staff development and welfare:

Importance of staff development, Training Vs Education, Function. Staff welfare. Inservice education, Continuing education and career Opportunities-Component, manager role.

APPLIED CLINICAL RESEARCH (ELECTIVE) (IE)

UNIT I: Introduction to clinical research

Basic pharmacology and drug dev	elopment	process, clinic	cal research	
definition, Basic terminology	used	in	clinical	
research, preclin	ical	studies,	Introduction	to pharma

UNIT II: Clinical trials

New drug discovery process- purpose, main steps involved in new drug discovery process, timelines of each steps, advantages and purposes of each steps, Pre clinical toxicology: General principles, Systemic toxicology, animaltoxicity requirements, Phase-I, II, III, IV trials: Introduction and designing, Various phases of clinical trials, Terminationoftrial,Safetymonitoringinclinicaltrials

UNIT III: Ethics & Regulations in Clinical research

Ethical Theories and Foundations, Ethics Review Committee and Informed
Consent Process, Integrity & Misconduct in Clinical Research
ClinicalTrialApplication in India Import & Export of Drug in India ,
Investigational New Drug application (IND), New Drug Application (NDA),
Abbreviated New Drug Application (ANDA), Post Drug Approval Activities,
PMS, FDA Audits and Inspections EU Regulatory Affairs

UNIT IV: Principles of controlled clinical trials

Clinicaltrialdesign(observationalandinterventional)protocol,consentinclinicaltri als,place bo, bias and methods to prevent bias, ethics in clinical trials, monitoring, problems and solutions of controlled clinical trials.

UNIT V: Biostatistics and data management

Preparation of a successful clinical study, Study management, Project

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management Documentation, Monitoring, Audits and Inspections Pharmacovigilance Training in clinical research Budgeting in clinical research, Supplies and vendor managemet

SEMESTER-VII & VIII

SL.NO	SUBJECT
1	Project/Dissertation

SEMESTER - VII (FOR ALL SPECIALITIES)

Project/ Dissertation

SEMESTER – VIII (FOR ALL SPECIALITIES)

INTERNSHIP -1 YEAR

A ronard Registrar Office earch Periyar E.V.R. 0 High Road z Maduravoyal 5 Chennai-95 to be Univers

C. B. Palaminde

REGISTRAR Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE (Deemed to be University) Periyar E.V.R. High Road, Maduravoyal, Chennai 600 095