Faculty of Biomedical Science

JSS ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED TO BE UNIVERSITY) MYSURU

JSS Academy of Higher Education & Research
(Deemed to be University)
Accredited "A" Grade by NAAC
Sri Shivarathreeshwara Nagar, Mysuru – 570 015

Regulation & Syllabus

BSc OPTOMETRY
2016

BSc AHS

REGULATIONS
B.Sc. Optometry

1. Courses offered in Allied Health Sciences:

a) Bachelor of Science in Medical Laboratory Technology [B.Sc. (MLT)]
b) Bachelor of Science in Anesthesia & Operation Theatre Technology [B.Sc. (AOTT)]
c) Bachelor of Science in Renal Dialysis Technology [B.Sc. (RDT)]
d) Bachelor of Science in Respiratory Care Technology [B.Sc. (RCT)]
e) Bachelor of Science in Medical Imaging Technology [B.Sc. (MIT)]
f) Bachelor of Science in Cardiac Care Technology [B.Sc. (CCT)]
g) Bachelor of Science in Perfusion Technology [B.Sc. (PT)]
h) Bachelor of Science in Emergency Medicine Technology [B.Sc. (EMT)].
i) Bachelor of Science in Physician Assistant [B.Sc. (P A)]
j) Bachelor of Science in Optometry [B.Sc. (optometry)]

1. Eligibility for admission

A candidate seeking admission to the Bachelor of Science Degree in Allied Health Sciences [a) to j) above], shall have studied English as one of the principal subjects and shall have passed (except for B.Sc. Imaging Technology):

a) Two year Pre-University examination or equivalent as recognized by JSS University, Mysore (JSSU) with Physics, Chemistry and Biology as principal subjects of study.

OR

b) Pre-degree course from a recognized University considered as equivalent by JSSU, (two years after ten years of schooling) with Physics, Chemistry and Biology as principal subjects of study.

OR

c) Any equivalent examination recognized by the JSSU for the above purpose, with Physics, Chemistry and Biology as principal subjects of study.

OR

d) Vocational higher secondary education course conducted by Vocational Higher Secondary Education, Government of Kerala with five subjects including Physics, Chemistry, Biology and English in addition to vocational subjects conducted, considered equivalent to 'plus - two' [10+2] examinations of Government of Karnataka Pre University Course.

OR

e) Two years diploma from a recognized Government Board in a subject for which the candidate desires to enroll in the respective Allied Health Sciences course and shall have passed 'plus two' [10+2] with Physics, Chemistry and Biology, as principle subjects.

OR

f) Three years diploma from a recognized Government Board in a subject for which the candidate desires to enroll in the respective Allied Health Sciences course, with Physics, Chemistry and Biology as principal subjects during the tenure of the course.

OR

g) Senior secondary course with Physics, Chemistry and Biology as principal subject of study equivalent to class XII, of open school education system of the central government and state government approved institutions.

h) In case of B.Sc. Imaging Technology the candidate shall have passed Pre-University or equivalent examination with Physics, Chemistry, Biology and Mathematics, as principal subjects of study.

1. Duration of the course

Duration shall be for a period of Six semesters (three years) followed by 12 months (one year) of internship.

2. Medium ofinstruction

The medium of instruction and examination shall be English.

3. Attendance

Candidates should have attended at least 75% of the total number of classes conducted in an academic year, from the date of commencement of the term to the last working day, as notified by the University, in each of the subjects prescribed for that year (theory, practicals, and clinical jointly) to be eligible to appear for the University examinations. Candidates lacking prescribed percentage of attendance in any subject shall not be eligible to appear for the University examination in that subject.

4. Internal assessment(IA)

There shall be a minimum of two Internal assessment examinations in theory and practical of each core subject spread over evenly in each semester. The average marks of the two IAexaminations shall be submitted to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of IAexaminations. Candidates have to secure 35% marks in the IA theory and practical jointly in each subject to become eligible to appear for the University examination. The marks of the IAexaminations must be displayed on the notice board of the respective departments within a fortnight from the date of IAexamination. If a candidate is absent for any of the IAexaminations due to genuine and satisfactory reasons, such a candidate may be given a re-examination, within a fortnight.

5. Subject and hours of teaching for theory and practicals

The number of hours of teaching theory and practical, course wise in each semester are shown in table I, II, III, IV, V and VI.

There are three compulsory core subjects in each semester. Language, Allied and Skill enhancement subjects are mandatory for all courses. Candidates shall select one elective subject each in fifth and sixth semester from the list mentioned in the table VII.

Table I: Distribution of teaching hours in first year subjects.

Category	Subjects	Theory hours	Credits	Practical hours	Credits	Total hours	Total credits
Core - 1	Anatomy	60	4	20	2	80	6
Core - 2	Physiology	60	4	20	2	80	6
Core - 3	Basic Biochemistry	60	4	20	2	80	6
Language -1	English	30	2	-	-	30	2
Language - 2	Kannada	30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table II: Distribution of teaching hours in Second Semester subjects

Category	Subjects	Theory hours	Credits	Practical hours	Credits	Total hours	Total credits
Core - 4	Pathology-	60	4	20	2	80	6
Core - 5	Microbiology	60	4	20	2	80	6
Core - 6	Pharmacology	60	4	20	2	80	6
Allied - 1	Health care	30	2	-	-	30	2
Allied - 2	Psychology	30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table III: Distribution of teaching hours in Third Semester subjects

Category	Subjects	Theory hours	Credits	Practical hours	Credits	Total hours	Total Credits
Core - 7	Ocular Anatomy, Physiology and Biochemistry	60	4	20	2	80	6
Core - 8	Physical Optics	60	4	20	2	80	6
Core - 9	Refraction	60	4	20	2	80	6
Skill Enhancement-1	Computer application	30	2	-	-	30	2
Allied-3	Environment science and Health	30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table IV: Distribution of teaching hours in Fourth Semester subjects

Category	Subjects	Theory hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 10	Ocular Diseases 1	60	4	200	2	260	6
Core - 11	Ocular Diseases 2	60	4	200	2	260	6
Core - 12	Ophthalmic Instruments and Appliances	60	4	200	2	260	6
Skill Enhancement-2	Biostatistics and Research methodology	30	2	-	-	30	2
Allied-4	Constitution of India	30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table V: Distribution of teaching hours in Fifth Semester subjects

Category	Subjects	Theory hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 13	Clinical & Advaced Refractions, Contact Lens	60	4	200	2	260	6
Core - 14	Clinical and Advanced Orthoptics	60	4	200	2	260	6
Core - 15	Community Ophthalmology, Low Vision Care and Eye bank	60	4	200	2	260	6
Elective-1	Medical Ethics	30	2	-	-	30	2
Allied-5		30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table VI: Distribution of teaching hours in Sixth Semester subjects

Category	Subjects	Theory hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 16	Optometric Optics & Dispensing Optics	60	4	200	2	260	6
Core - 17	Contact Lens, Practice Management & Occupational Optometry	60	4	200	2	260	6
Core - 18	Systemic Diseases & Management of OT	60	4	200	2	260	6
Elective-2		30	2	-	-	30	2
Allied-6	Hospital Management	30	2	-	-	30	2
Total Credits	18 + 2 + 2						

Table VII: Elective Subjects

Elective Subjects	Offering Departments
Fifth Semester	
Immunotechniques in diagnosis of diseases	Pathology and Microbiology
Dental Radiography	Radio diagnosis
Pulmonary Function Testing	Pulmonary Medicine
Telemedicine	Dermatology (Dr Kantharaj)
Hands on training in Continuous ambulatory peritoneal dialysis	Nephrology
Echocardiography (Cardiology)	Cardiology
Echocardiography (CTVS)	Cardio Thoracic Vascular Surgery
Difficult airway intubation	Anesthesiology
Sixth Semester	
Molecular Techniques	Biochemistry
Digital Subtraction Angiography	Radio diagnosis
Polysomnography	Pulmonary Medicine
Practice Management	Health system management studies
Renal Transplant	Nephrology
Coronary angiography	Cardiology
Intra Aortic Balloon pump	Cardio Thoracic Vascular Surgery
Ventilator management	Anesthesiology

Extension Activity

The following extension activities shall be provided for the ability enhancement of the candidates, to provide better health care services. The certificate shall be provided by the offering departments. The Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) shall be as per the American Heart Association guidelines and certification.

Extension Activity	Courses	Semester	Offering departments
Phlebotomy	All courses	III	Anaesthesiology
Basic life support *(Optional on payment basis)	All courses	IV	Emergency medicine
Small Project/data Analysis/Industrial visit	All courses	V	Concerned departments of the Course
Advanced cardiac life support *(Optional on payment basis)	Respiratory Care Technology, Emergence Medicine Technology, Anaesthesia and OT Technology, Cardiac Care	VI	Emergency medicine

7. End Semester Examination

a) University examinations (UE): The University shall conduct examination for the core subjects at the end of each semester. The candidates, who satisfy the requirement of attendance and internal assessment, shall be eligible to appear for the University examination. The head of the institution shall verify the same before forwarding the applications to the University within stipulated time along with the prescribed fee.

b) Non-University Examinations (NUE): Examination for Languages, Allied subjects, Skill enhancement and Elective subjects shall be conducted by the college and the marks obtained shall be submitted to the University along with the IA marks of the core subjects at least 15 days before the commencement of the University examination. The marks of non-core subjects shall be incorporated in the marks card issued by the University.

c) The candidate must have passed all the previous subjects (Core/Language/Skill enhancement/ Allied/elective), to appear for the sixth semester University examination.

8. Scheme ofExamination:

Distribution of subjects and marks for each semester theory and practical examinations are shown in the Table - VIII, IX, X, XI, XII and XIII.

Table VIII: Distribution of Subjects and marks for First Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 1	Anatomy	30	70	-	100	10	40	-	50
Core - 2	Physiology	30	70	-	100	10	40	-	50
Core - 3	Basic Biochemistry	30	70	-	100	10	40	-	50
Language-1	English	-	-	50	50	-	-	-	-
Language-2	Kannada	-	-	50	50	-	-	-	-

Table IX: Distribution of Subjects and marks for Second Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 4	Pathology	30	70	-	100	10	40	-	50
Core - 5	Microbiology	30	70	-	100	10	40	-	50
Core - 6	Health care	30	70	-	100	10	40	-	50
Allied -1	Psychology	-	-	50	50	-	-	-	-
Allied -2	Kannada	-	-	50	50	-	-	-	-

Table X: Distribution of Subjects and marks for Third Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 7	Ocular Anatomy, Physiology and Biochemistry	30	70	-	100	10	40	-	50
Core - 8	Physical Optics	30	70	-	100	10	40	-	50
Core - 9	Refraction	30	70	-	100	10	40	-	50
Skill Enhancemen-1	Computer application	-	-	50	50	-	-	-	-
Allied-3	Environment science and Health	-	-	50	50	-	-	-	-

Table XI: Distribution of Subjects and marks for Fourth Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 10	Ocular Diseases I	30	70	-	100	10	40	-	50
Core - 11	Ocular Diseases 2	30	70	-	100	10	40	-	50
Core - 12	Ophthalmic Instruments And Appliances	30	70	-	100	10	40	-	50
Skill Enhancement-2	Biostatistics and Research methodology	-	-	50	50	-	-	-	-
Allied-4	Constitution of India	-	-	50	50	-	-	-	-

Table XII: Distribution of Subjects and marks for Fifth Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 13	Clinical & Advanced Refractions, Contact Lens	30	70	-	100	10	40	-	50
Core - 14	Clinical And Advanced Orthoptics	30	70	-	100	10	40	-	50
Core - 15	Community Ophthalmology, Low Vision Care and Eye bank	30	70	-	100	10	40	-	50
Elective 1		-	-	50	50	-	-	-	-
Allied-5	Medical	-	-	50	50	-	-	-	-

Table XIII: Distribution of Subjects and marks for Sixth Semester theory and practical examination

Category	Subjects	Theory				Practical			
		IA	UE	NUE	Total	IA	UE	NUE	Total
Core - 16	Optometric Optics & Dispensing Optics	30	70	-	100	10	40	-	50
Core - 17	Contact Lens, Practice Management Occupational Optometry	30	70	-	100	10	40	-	50
Core - 18	Systemic Diseases & Management of OT	30	70	-	100	10	40	-	50
Elective 2		-	-	50	50	-	-	-	-
Allied-6	Hospital Management	-	-	50	50	-	-	-	-

Question paper pattern for end semester University theory examinations (70 marks)

I	Long Answers	(Answer 2 out of 3)	2 x 10 = 20
II	Short Essay	(Answer 7 out of 9)	7 x 5 = 35
III	Answer	(Answer all 5)	5 x 3 = 15
		Total =	70 marks

Question paper pattern for end semester Non-University theory examinations (50 marks)

I	Long Answers	(Answer 1 out of 3)	1 x 10 = 10
II	Short Essay	(Answer 5 out of 7)	5 x 5 = 25
III	Answer	(Answer all 5)	5 x 3 = 15
		Total =	50 marks

Examiners

a) Appointment of Examiners
Examiners shall be appointed by the University to conduct the end semester University examinations, from the panel of examiners approved by the Board of Studies. For Practical examinations, there shall be one external examiner and one internal examiner. Theory paper shall be valued by both the examiners.

b) Qualification and Experience of Examiners
For question paper setting and external examiner: Post graduation in the respective field with five years of teaching experience.
For Internal examiners: Post graduation in the respective field with three years of teaching experience.

10. Criteria for pass

Core Subjects: Candidates are declared to have passed in a subject, if they secure 40% of marks in University examination and internal assessment added together. Theory & practical shall be considered as separate subjects. If a candidate passes in practical examination but fails in theory paper, such candidate is exempted from reappearing for practical but shall have to appear in the subsequent examination for the theory paper in which the candidate has failed OR vice versa.

Language papers, allied papers, skill enhancement and elective papers:
The minimum prescribed marks for a pass shall be 35% of the maximum marks prescribed for a subject.

11. Grading of performances

a) Letter grades and grade points allocations
Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table - XIV.

Table - XIV: Letter grades and grade points equivalent to percentage of marks and performances

Percentage of Marks obtained	Letter Grade	Grade Point	Performance
90.00 - 100	O	10	Outstanding
80.00 - 89.99	A	9	Excellent
70.00 - 79.99	B	8	Good
60.00 - 69.99	C	7	Fair
50.00 - 59.99	D	6	Satisfactory
40.00 - 49.99	E	5	Average
Less than 40	F	0	Fail
Absent	AB	0	Fail

A candidate who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

b) The Semester Grade Point Average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C_1, C_2, C_3, C_4 and C_5 and the student's grade points in these courses are G_1, G_2, G_3, G_4 and G_5, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

c) Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$CGPA = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + C_8S_8}{C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8}$$

where C_1, C_2, C_3,…. is the total number of credits for semester I,II,III,…. and S_1, S_2, S_3,….is the SGPA of semester I,II,III,…. .

12. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction	= CGPA of. 7.50 and above
First Class	= CGPA of 6.00 to 7.49
Second Class	= CGPA of 5.00 to 5.99
Pass Class	= CGPA of 4.00 to 4.99

13. Carry over

A candidate should pass all the subjects (core/language/skill enhancement/ allied/elective) of first semester, to enter into the third semester. Similarly, second semester subjects should be cleared before entering fourth semester and third semester subjects should be cleared before entering fifth semester. However, the candidate must have passed all the previous subjects (core/language/skill enhancement/ allied/elective) to appear for the sixth semester University examination.

14. Internship

Twelve months (one year) internship shall be mandatory after successful completion of sixth semester examination. The 'Internship Completion Certificate' shall be issued by the college and copy of same is submitted to the University.

15. Award of Ranks/Medals

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more subject during the course shall not be eligible for award of ranks.

16. Award of degree

A candidate who has passed in all the subjects (core/language/allied/skill enhancement/elective papers) of all the semesters and has successfully completed the internship shall be eligible for award of degree.

17. Revaluation and Re-totaling of answer papers

There is no provision for revaluation of the answer papers in any examination. However, the candidates can apply for re-totaling by paying prescribed fee.

18. Maximum duration for completion of course

A candidate shall complete the course within six years from date of admission, failing, which candidate shall re-register for the course.

I Semester
Core-1 Anatomy

Objectives:

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

- Describe the structure, composition and functions of the organ systems of human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.

Learning Objectives: Skills

- Use the process of prosection to investigate anatomical structure.
- Use the microscope to learn anatomical or histological structure.
- Learn how to study, interpret and care for anatomical specimens.

Contents
Theory:

Unit I

Organization of the Human Body **12hrs**

Introduction to the human body

Definition and subdivisions of anatomy

Anatomical position and terminology

Cell - Definition of a cell, shapes and sizes of cells

- Parts of a cell - cell membranes, cytoplasm, sub cellular organelles.

Cell Division - Definition and main events in different stages of mitosis and meiosis.

Tissues - Tissues of the body

- Definition and types of tissues
- Characteristics, functions and locations of different types of tissues
- Epithelial tissue - definition, classification with examples
- Glands- classification with examples

Unit II

Locomotion and Support **12hrs**

1. **Cartilage - Types with examples**
2. **Skeletal system**

Skeleton - Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Marking of bones. Functions of bones.Development (types and ossification) and growth of bone.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, ligaments, movements possible and the muscles producing such movements of the joints of the body.

3. Muscular system

Parts of the Skeletal muscle. Definition of origin and insertion. Classification of muscular tissue. Compartment muscles of upper limb, lower limb, sternocleidomastoid

Unit III

Maintenance of the Human Body **12hrs**

1. 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 and blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of major arteries and veins.

2. Lymphatic system

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

3. Respiratory system

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

4. Digestive system

Names of organs of digestion. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder

Unit IV

1. Urinary system and Reproductive system **12hrs**

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

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 & its supports, uterine tube, ovary & mammary gland.

2. Development

Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles, events of 1^{st}, 2^{nd} and 3^{rd} weeks of development, folding of embryo. Derivatives of germ layers, placenta

Unit V

Control Systems of the Body **12hrs**

1. Nervous system

Sub-divisions of the nervous system

Brain - Sub-divisions, location external features and internal structure of medulla oblongata, pons, mid-brain, cerebellum and cerebrum.

Spinal cord - Location, extent, spinal segments, external features and internal structure.

Location and features of thalamus and hypothalamus.

Locations and subdivisions of basal ganglia. 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

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 :

1. Demonstration of parts of microscope and its uses
2. Demonstration of skeleton and joint
3. Demonstration of deltoid and gluteus maximus, Cubital fossa
4. Demonstration of heart and its blood supply, demonstration of major arteries of upper limb and lower limb, histology of cardiac muscle and histology of vessels
5. Demonstration of location and parts of lungs, histology of trachea and lungs
6. Demonstration of location of stomach, small and large intestines. Location and features of pancreas, liver and gall bladder
7. Demonstration of location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra
8. Demonstration of location of male and female reproductive organs
9. Demonstration of brain and spinal cord
10. Histology of cornea and retina

Practical Examination Pattern **40 Marks**

1. Gross Anatomy- Discussion of any one specimen -10 Marks

   Disscusion of specimens of Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system
2. Spotters - Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system - 10x2=20 Marks
3. Histology discussion of any one demonstrated slide - 10 Marks

Recommended Books Recent Editions:

1. Ross and Wilson: Anatomy and Physiology in Health and illness
2. Understanding Human Anatomy and Physiology, William Davis (p) MC Graw Hill
3. Essentials of Human Embryology. Bhatnagar, Orient Blackswan Pvt. Ltd.
4. Anatomy for B.Sc Nursing by Renu Chauhan. Arichal publishing company 2012
5. Hand book of Anatomy BD Chaurasia
6. Basics in Human Anatomy for B.Sc. Paramedical Courses 1st edition 2008 Jaypee Publishers

Reference books:

1. B D Chaurasia: Regional Anatomy. Vol I, II, III 6th edition

I Semester
Core- 2 Physiology

Objectives

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

1. Blood cell counts
2. Nerve and muscle functions
3. Cardiac functions
4. Pulmonary functions
5. Renal functions
6. The actions of various hormones
7. Functions of Central nervous system and special senses

Contents:

Theory

Unit -I

General physiology and Blood **12 Hrs**

General Physiology (2 Hrs)

- Organization of the cell and its function, homeostasis
- Transport across cell membrane
- Membrane Potentials - Resting Membrane Potential & Action Potential
- Body Fluid Compartments - Normal Values

Blood (10 Hrs)

- Introduction: composition and function of blood.
- Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation.
- Structure, function, concentration, physiological variation, methods of estimation of haemoglobin.
- White blood cells: production, function, count.
- Platelets: origin, normal count, morphology & functions.
- Plasma proteins: types, functions
- Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting - Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching.

  Rh system: Rh factor, Rh incompatibility. Blood transfusion: indication. transfusion reactions.
- Anticoagulants: classification, examples and uses.

  Anaemias: morphological and etiological classification, -Blood indices: CI, MCH, MCV, MCHC.
- Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values.

Unit -II

Digestive system & Respiratory system **12hrs**

Digestive System (4Hrs)

- Physiological anatomy of gastro intestinal tract, functions of digestive system.
- Salivary glands: structure and functions, deglutition: stages and regulation.
- Stomach: structure and functions. Gastric secretion: composition function regulation of gastric juice secretion.
- Pancreas : structure, function, composition of pancreatic juice
- Functions of liver. Bile secretion, composition, function. jaundice: types.
- Functions of gall bladder.
- Small intestine: functions, digestion, absorption, movements.
- Large intestine: functions, movements defecation

Respiratory system (8 Hrs)

- Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles.
- Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary & intrapleural pressure.
- Surface tension, recoil tendency of the thoracic cage and lungs .
- Transport of respiratory gases: transport of oxygen & carbon dioxide, oxy haemoglobin dissociation curve, factors affecting it.
- Lung volumes and capacities - normal values
- Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre.
- Applied physiology : hypoxia, cyanosis, dyspnoea, apnoea.

Unit -III

Cardiovascular and Endocrine system **12hrs**

Cardiovascular system (7Hrs)

- Heart: Physiological Anatomy, Nerve supply.
- Properties of cardiac muscle, cardiac cycle:
- Conducting System of Heart, Origin and Spread of Cardiac Impulse
- Electrocardiogram (ECG) waves and normal duration. Recording
- Cardiac Cycle: Phases and Volume Changes
- Normal heart sounds, areas of auscultation. Pulse: jugular, radial pulse,
- Cardiac output : definitions of stroke volume, cardiac index, factors Affecting It. measurement of Cardiac output.
- General principles of circulation
- Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension. Factors affecting it and regulation

- Physiological variations & regulation of heart rate.
- Coronary circulation.
- Shock

Endocrine System (5 Hrs)

- Classification of endocrine glands & Definition of hormone.
- Pituitary hormones: anterior and posterior pituitary hormones, secretion, functions
- Thyroid gland: physiological anatomy, hormone secreted, physiological function, regulation, secretion, disorders (hypo and hyper secretion of hormone).
- Adrenal cortex: physiological anatomy. cortical hormones, functions and regulation.
- Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline.
- Hormones of pancreas. Insulin: secretion, regulation, function and action.

  Diabetes mellitus: regulation of blood glucose level.
- Parathyroid gland: function, action, regulation of secretion of parathyroid hormone.

  Calcitonin:

Unit -IV

Excretory system and Reproductive system **12 hrs**

Excretory System (8Hrs)

- Functional anatomy of kidney
- Juxta glomerular apparatus: structure and function.
- Glomerular filtration
- Tubular function(reabsorption and secretion)
- Micturition, innervation of bladder, cystometrogram.
- Artificial kidney, renal function tests skin and body temperature

Reproductive system (4Hrs)

- Male reproductive system: functions of testes, spermatogenesis: Endocrine functions of testes -Female reproductive system: oestrogen, progesteron, menstrual cycle: ovulation, physiological changes during pregnancy, pregnancy tests.
- Lactation: composition of milk, factors controlling lactation.

Unit -V

Muscle nerve physiology, Nervous system and Special senses **12hrs**

Muscle nerve physiology (3Hrs)

- Classification and properties of neuron and neuroglia. Classification of nerve fibers
- Classification of muscle, structure of skeletal muscle,
- Neuromuscular junction. Transmission across nmj
- Excitation contraction coupling. muscle tone, fatigue, rigor mortis

Nervous system (5Hrs)

- Organisation of nervous system
- Synapse: structure, types, properties.
- Receptors: definition, classification, properties. Sensations-pain
- Organization Spinal cord. Ascending tracts, descending tracts.
- Reflex : definition reflex arc, clinical classification of reflexes : Babinski's sign.
- Hypothalamus- functions
- Cerebral cortex lobes - functions,
- Cerebellum- functions
- Basal ganglia functions.
- Cerebro Spinal Fluid (CSF) : formation, circulation & reabsorption . composition and functions. Lumbar puncture.
- Autonomic Nervous System: Sympathetic and parasympathetic distribution

Special senses (4Hrs)

- Vision: structure of eye, function of different parts. Structure of retina. visual pathway, errors of refraction
- Hearing: structure and functions of ear.
- Taste : taste buds and taste pathway.
- Olfaction : receptors, pathway.

Practicals (20 Hrs)

1. Haemoglobinometry.
2. Haemocytometry
3. Total leucocyte count.
4. Total Red blood cell count.
5. Determination of blood groups.
6. Differential WBC count.
7. Determination of clotting time, bleeding time.
8. Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume, Calculation of Blood indices: CI, MCH, MCV, MCHC.
9. Blood pressure recording.
10. Spirometery, Artificial Respiration

Practical Examination : 40 Marks

1. Estimation of Hemoglobin. - 10 marks
2. Determination of Blood Groups. - 10 marks
3. Determination of Bleeding and Clotting time. - 10 marks
4. Spotters-Haemocytometer, (Identification of cells) Differential Count, Sphygmomanometer, Spirometer . - 10 marks

Recommended Books Recent Editions

1. A.K.Jain, Human Physiology and Biochemistry for Physical Therapy and Occupational Therapy, 1st Ed. Arya Publication.
2. Dr. Venkatesh.D and Dr. Sudhakar H.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Book.

Reference Books

1. A.K.Jain, Text book of Physiology for Medical Students, 4th Ed. Arya Publiction.
2. Guyton (Arthur) Text Book of Physiology.11th Ed. Prism Publishers.
3. Ganong (William F) Review of Medical Physiology. 23rd Ed . Appleton.

I Semester

Core- 3- Basic Biochemistry

Unit I **12hrs**

Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids &Nucleotides-

Cell- Structure & Function of Cell Membrane, Subcellular Organelles and their Functions.

Carbohydrates- Definition, Classification & Biological importance of carbohydrates, Derivatives of Monosaccharides.

Proteins- Definition & Classification of amino acids & Proteins, Biologically important peptides Plasma proteins, Immunoglobulins.

Lipids- Definition, Classification & Biological importance and Functions of Lipids. Structure and functions of Cholesterol, types and functions of Lipoproteins.

Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides.

Unit II **12hrs**

Enzymes & Acid base balance

Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition & Regulation of enzyme activity

Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

Unit III **12hrs**

Vitamins & Minerals

Vitamins-Classification, Sources, RDA, Functions(in brief), deficiency manifestations and hypervitaminosis.

Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, selenium, sodium, potassium and chloride.

Unit IV **12hrs**

Nutrition, Blood chemistry & Urine Chemistry

Nutrition- Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications, Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance, Protein energy malnutrition, Total parenteral nutrition, dietary fibers.

Blood chemistry- Biochemical components & their reference ranges in normal & diseased states.

Urine chemistry- Biochemical components & their reference ranges in normal & diseased states

Unit V **12hrs**

Clinical Biochemistry- 10 hrs

Specimen Collection- Blood,Urine and Body fluids.

Preanalytical, analytical and postanalytical errors

Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases.

Diagnostic enzymology, Assessment of arterial Blood gas status and electrolyte balance, Point of Care Testing. Renal Function tests(in brief), Liver function tests(in brief), Biomedical Waste Management.

Practicals

1. General Reactions of Carbohydrates.
2. Color reactions of Proteins.
3. Reactions of Non Protein nitrogenous substances.
4. Demonstration of pH meter, Colorimeter and spectrophotometer.
5. Demonstration of Chromatography and Electrophoresis.

Practical Examination

1. Identification of Substance of physiological importance - 10 Marks
2. Color reactions of Proteins - 10 Marks
3. Spotters - 10 Marks
4. Charts on Clinical biochemistry - 10 Marks

Recommended books Recent edition

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry -Pankaja Naik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

Reference Books Recent Edition

1. Harpers Biochemistry
2. Clinical Biochemistry-Michael L.Bishop
3. Textbook of Biochemistry-Rafi M.D
4. Lippincott's Illustrated review of Biochemistry
5. Practical Clinical Biochemistry-Harold Varley

I Semester

Language-1English

Unit I

Introduction

a) Study Techniques - Reading Comprehension

Exercises on reading passages and answering questions based on the passage.

b) Organization of Effective Note Taking

Why good note-taking is important

Effective note-taking is an important practice to master at university. You have a lot of new knowledge and you need to develop reliable mechanisms for recording and retrieving it when necessary. But note-taking is also a learning process in itself, helping you to process and understand the information you receive.

c) Use of the Dictionary

Tips on how to use the dictionary

1. Choose the right dictionary.
2. Read the introduction.
3. Learn the abbreviations.
4. Learn the guide to pronunciation.
5. Looking Up a Word
   a) Find the section of the dictionary with first letter of your word.
   b) Read the guide words.
   c) Scan down the page for your word.
   d) Read the definition.
6. Online dictionaries
7. Research various facts.
8. Thesaurus

It is a dictionary of synonyms and antonyms, such as the online Thesaurus.com.

Enlargement of Vocabulary

Roots : A to G

Effective Diction

Foreign Expressions - meaning and pronunciation

Unit II

Applied Grammar

a) Correct Usage

The Eight Parts of Speech

1. Noun
2. Pronoun
3. Adjective
4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection

b) The Structure of Sentences

What is a sentence?

What are clauses?

What are phrases?

Types of sentences:

1. Simple sentences
2. Compound sentences
3. Complex sentences

c) The Structure of Paragraphs

1. What is a Paragraph?

Paragraphs are comprised of sentences, but not random sentences. A paragraph is a group of sentences organized around a central topic.

2. The Secrets to Good Paragraph Writing:

Four Essential Elements

The four elements essential to good paragraph writing are: unity, order, coherence, and completeness.

4. Paragraph Structure

A paragraph consists of 3 main structures :

1. Claim
2. Evidence
3. Analysis

d) Enlargements of Vocabulary

Roots: H to M

Unit III

Written Composition

a) Precise writing and Summarizing

1. Definition of precise:

   A precise or summary is an encapsulation of someone's writing or ideas.

   Technically it should be one - third the length of the actual passage given.

2. Definition of summary:

   Summaries may not always follow a direct line through what they're summarizing - if you want to summarize someone else's ideas in a few sentences, it might make more sense if you begin with their conclusion, and work back to the arguments they use to develop that conclusion.

Guidelines to follow while writing a summary are:

1) Divide…and conquer.
2) Read.
3) Reread.
4) One sentence at a time.
5) Write a thesis statement.
6) Check for accuracy.
7) Revise.

b) Writing of a Bibliography

I. What is a bibliography?

A bibliography is an alphabetical list of all materials consulted in the preparation of your assignment.

II. What is an annotated bibliography?

An annotated bibliography is an alphabetical list of books or articles for which you have added explanatory or critical notes.

III. Why you must do a bibliography?

a) To acknowledge and give credit to sources of words, ideas, diagrams, illustrations and quotations borrowed, or any materials summarized or paraphrased.

b) To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.

IV. What must be included in a bibliography?

- [redacted]hor
- [redacted]
- [redacted]e of publication
- [redacted]lisher
- [redacted] date of publication
- [redacted]e number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopedias, or in anthologies).

V. Writing a bibliography in MLA style

1. Standard Format for a Book:

Author. Title: Subtitle. City or Town: Publisher, Year of Publication.

If a book has no author or editor stated, begin with the title. If the city or town is not commonly known, add the abbreviation for the State or Province.

2. Standard Format for a Magazine, Periodical, Journal, or Newspaper Article:

Author. "Title: Subtitle of Article." Title of Magazine, Journal, or

Newspaper Day, Month, Year of Publication: Page Number(s).

c) Enlargement of Vocabulary

Roots - N to S

Unit IV

Reading and Comprehension

a) Review of selected materials and express oneself in one's words

Seminar for students on powerpoint presentation and book review.

b) Enlargement of Vocabulary

Roots - T to Z

Unit V

The study of Varioius forms of Composition

a) Paragraph

Exercises for students on short paragraph topics.

b) Essay

How to Write an Essay

The writing of an essay has three stages :

1. Essay writing
2. Close reading
3. Research

c) Letter

Mechanics of writing formal and business letters.

Exercises on writing letters for students.

d) Summary

Writing reports: project report, magazine article and reporting in newspapers on sporting events.

e) Practice In Writing

Exercises and assignments on report writing for students.

Unit VI

Verbal Communication

a) Discussions And Summarization

Tips on taking minutes of a meeting

Why Meeting Minutes Matter

Meeting minutes are important. They capture the essential information of a meeting - decisions and assigned actions. The following instructions will help you take useful and concise meeting minutes.

Before the Meeting

If you are recording the minutes, make sure you aren't a major participant in the meeting. You can't perform both tasks well.

Create a template for recording your meeting minutes and make sure you leave some blank space to record your notes.

Decide how you want to record your notes. If you aren't comfortable relying on your pen and notepad, try using a tape recorder or, if you're a fast typist, take a laptop to the meeting.

During the Meeting

As people enter the room, check off their names on your attendee list. Ask the meeting lead to introduce you to meeting attendees you aren't familiar with. This will be helpful later when you are recording assigned tasks or decisions.

After the Meeting

Review the notes and add additional comments, or clarify what you didn't understand right after the meeting.

a) Debates

Group Discussions:

1. Do's in a group discussion:

- Be confident. Introduce yourself with warm smile and get into topic soon.
- Have eye contact with all group members
- Learn to listen.
- Be polite.
- Be a good team player. Move with all group members and help them when needed.

2. Don'ts in a group discussion:

- Don't be harsh when you are interrupted.
- Don't interrupt the other person
- Don't try to push your ideas on others.
- Don't argue. Everyone is free to express their ideas.

c) Oral Reports

An oral report is a presentation, usually done for a student's teacher and classmates, though it can also be done for a larger segment of the school community, for parents, or for a more open group, depending on the circumstances. For example, at a science fair, a student might present a report on his or her project periodically for the class, for other visitors who pass by, and for judges.

d) Use in Teaching

Writing of dialogues

Originating from dialogos, the Greek word for conversation, the term dialogue refers to a verbal conversation between two or more people.

When writing dialogues, it is important to adhere to specific grammar rules. The following points need to be remembered while writing dialogues for role play.

1. Quotation Marks
2. Periods
3. Question Marks
4. Commas
5. Capitalization and Paragraphs
6. How Dialogue Enhances Writing

Dialogue reveals information about the speaker(s) within a written work. Dialogue also enhances the story line and plot.

a) Exposes Character Traits

Through indirect characterization, dialogue reveals details about a character by what they say, how they say it, and perhaps what they choose not to say.

b) Unveils Mood/Emotions

A character's word choice, description of tone, and choice of language reveal the inner state of the character without directly "telling" the audience. Showing instead of telling creates a deeper understanding of the character through the eyes of the reader or audience.

c) Reveals Motivation/Influences

Dialogue can illuminate a character's internal motivation or desires.

d) Establishes Relationships

Seeing how a character addresses and responds to other characters shows the type of relationships that they form and where their relationships currently stand. Dialogue can demonstrate how relationships change throughout the course of the story. It can show how a character changes or responds to various situations.

Exercises for students on preparing a dialogue exchange between two people

1. On the street (with a vegetable vendor)
2. At college with a lecturer (regarding admissions)
3. In a bank with the manager (for opening a bank account)
4. Telephone conversation with a hotel receptionist (make room reservations)
5. Telephone conversation (taking an appointment with the dentist/doctor)

I Semester

Language 2- Kannada

PÀ£ÀßqÀ : MAzÀÄ

¥ÀoÀå¥ÀĸÀÛPÀ ¸ÀA¥ÁzÀPÀgÀÄ

¸ÀA¥ÁzÀPÀgÀÄ : ©.J¸ï.¹. (C¨ÉÃqï ªÉ¯ï ¸ÉÃ£ïPÉÆÃ¸ïð) ªÉÄzÀ®ªÀµÀð

¸ÀªÀÄAiÀÄ : 30 WÀAmÉUÀ¼ÀÄ (ªÀÄÆ®ªÀvÀÄ WÀAmÉUÀ¼ÀÄ)

¥ÀoÀå¥ÀĸÀÛPÀ «ªÀgÀuÉ : «zÁåyð/ «zÁåyð¤AiÀÄgÀÄ ¢£À¤vÀå ¸ÀA¥ÀQð¸À§ºÀÄzÁzÀ dUÀvÀÛ£À ¸ÀªÀiÁf£ÀªÉÆqÀ£É ¸ÀA§AzsÀzÀAvÉ PÀ£ÀßqÀzÀ° ¸ÀAªÀºÀ£À ¸ÁzsÀåªÁUÀĪÀ ¥ÀoÀå¥ÀĸÀÛPÀzÀ ªÀÄÄzÀæuÁ®AiÀÄ C¼ÀªÀr¸À¯ÁVzÉ.

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GzÉÝñÀ : ¢£À§¼ÀPÉAiÀÄ ªÀåªÀºÁgÀzÀ°è ¥ÀzÀPÉÆñÀªÀ£ÀÄß ¸ÀA§AzÀ¥ÀlAvÉ PÀ£ÀßqÀ §gÀªÀtÂUÉ C¼ÀªÀr¸ÀÄ. PÀ£ÀßqÀ ¨sÁµÉAiÀÄ ¥ÀjZÀAiÀÄ ªÀiÁrPÉÆqÀĪÀÅzÀÄ.

¥ÀoÀå¥ÀĸÀÛPÀ «ªÀgÀuÉ

WÀlPÀ MAzÀÄ (DgÀÄ WÀAmÉUÀ¼ÀÄ) : CPÀëgÀªÀiÁ¯É, ¸ÀégÀUÀ¼ÀÄ, ªÀåAd£ÀUÀ¼ÀÄ, PÁUÀÄtÂvÀ, ¸ÀAAiÀÄÄPÁëgÀ, C£ÀÄ¸ÁégÀ.

ZÀlĪÀnPÉ : 1. PÀ£ÀßqÀ ªÀtðªÀiÁ¯ÉAiÀÄ CPÀëgÀUÀ¼À£ÀÄß §gÉ¬Äj.

WÀlPÀ JgÀqÀÄ (DgÀÄ WÀAmÉUÀ¼ÀÄ) : ¥ÀzÀ¥ÀjZÀAiÀÄ, ¥ÀzÀ¥ÀÄAd, ¢£À§¼ÀPÉAiÀÄ ¥ÀzÀUÀ¼ÀÄ, ¸ÀA§AzsÀUÀ¼ÀÄ, £ÁªÀÄ¥ÀzÀ, ¸ÀªÀÄðªÀiÁ, CAQUÀ¼À ¥ÀjZÀAiÀÄ, ¥ÀæuÁ« ¥ÀzÀUÀ¼ÀÄ.

ZÀlĪÀnPÉ : 1. ¤ªÀÄä w½¢gÀĪÀ «µÀAiÀÄ ¸ÀA§AzsÀ ªÁPÀåUÀ¼À£ÀÄß ¥ÀnÖªÀiÁr.

2. ¤ªÀÄä w½¢gÀĪÀ wAr – w¤¸ÀÄUÀ¼À ªÁPÀåUÀ¼À£ÀÄß ¥ÀnÖªÀiÁr.

WÀlPÀ ªÀÄÆgÀÄ (DgÀÄ WÀAmÉUÀ¼ÀÄ) : ºÀtÄ, ªÀiÁ£À, CªÀAiÀÄ, wAr – w¤¸ÀÄUÀ¼À ¥ÀjZÀAiÀÄ, zÉÊ£ÀA¢£À CAUÀrUÀ¼À ¥ÀjZÀAiÀÄ, «µÀAiÀÄ §UÉAiÀÄ ªÁPÀåUÀ¼À ¥ÀjZÀAiÀÄ.

ZÀlĪÀnPÉ : ªÁPÀåVAiÀÄ «ªÀgÀ w½AiÀÄ®Ä DgÀvÉAiÀÄ°è §¼À¸ÀĪÀ £ÀªÀÄÆ£ÉAiÀÄ ªÀiÁzÀjAiÀÄ£ÀÄß §gɬÄj.

WÀlPÀ £Á®Ä (DgÀÄ WÀAmÉUÀ¼ÀÄ) : ¸ÀA¨sÁµÀuÉ ¥ÀzÀUÀ¼ÀÄ, DgÀvÉAiÀÄ°è §¼À¸ÀĪÀ «µÀAiÀÄ £ÀªÀÄÆ£ÉUÀ¼À ¥ÀjZÀAiÀÄ, £ÀªÀÄÆ£ÉUÀ¼À ¨sÁµÉ.

ZÀlĪÀnPÉ : ¸ÀA¨sÁµÀuÉ ªÀiÁqÀĪÀ ªÁPÀåVAiÀÄ £ÀqÀĪÀ¼À ¸ÀA§gÀºÀuÉAiÀÄ ªÀiÁzÀjAiÀÄ£ÀÄß vÀAiÀiÁj¹.

WÀlPÀ LzÀÄ (DgÀÄ WÀAmÉUÀ¼ÀÄ) : ¸ÀA¨sÁµÀuÉ ºÁUÀÆ ªÁPÀåVUÀ¼À £ÀqÀĪÉ £ÀqÉAiÀÄĪÀ ¸ÀA§gÀºÀuÉ ªÉÆzÀ¯ÁzÀ ªÀiÁzÀjUÀ¼À ¥ÀjZÀAiÀÄ.

CzsÀåAiÀÄ£ÀPÉÌ ²¥sÁgÀ¸ÀÄ ªÀiÁrzÀ ¥ÀĸÀÛPÀUÀ¼ÀÄ

1. PÀ£ÀßqÀ ªÀiÁvÀÄ (8,9 ªÀÄvÀÄÛ 10£Éà vÀgÀUÀwAiÀÄ PÀ£ÀßqÀ ¸ÀºÀ¥ÁoÀ, ¥ÀoÀå¥ÀĸÀÛPÀUÀ¼ÀÄ E¯ÁSÉ)
2. ªÀåªÀºÁjPÀ PÀ£ÀßqÀ : JZï.J¸ï
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6. ªÉÊzÀå ¥ÀzÀUÀ¼À ªÀiÁ»w : qÁ|| r.J¸ï.²ªÀ¥Àà

PÀ£ÀßqÀ: JgÀqÀÄ

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¸ÀA¥ÁzÀPÀgÀÄ : ©.J¸ï.¹(C¨ÉÃqï ªÉ¯ï ¸ÉÃ£ïPÉÆÃ¸ïð) ªÉÄzÀ® ªÀµÀð

¸ÀªÀÄAiÀÄ : 30 WÀAmÉUÀ¼ÀÄ (ªÀÄÆ®ªÀvÀÄ WÀAmÉUÀ¼ÀÄ)

GzÉÝñÀ : dUÀvÀÛ DqÀÆÃvÀzÀ §UÉÎ ¸ÀªÀÄUÀæªÁV w½¹PÉÆqÀĪÀÅzÀÄ.

II Semester
Core 4-General Pathology

Unit I

Introduction- & scope of pathology **12hrs**

Cell injury and Cellular adaptations - Normal cell, Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia.

Inflammation-Introduction, acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation-general features, granulomatous inflammation, tuberculosis.

Healing and repair - Definition, different phases of healing, factors influencing wound healing, fracture healing.

Haemodynamic disorders-Oedema, hypermia, congestion, haemorrhage, embolism, thrombosis, infarction.

Neoplasia - defintion, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions.

Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies.

Unit II

Haematological Disorders **12hrs.**

Introduction and Haematopoiesis

Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency , lab findings, megaloblastic anamia: causes, labfindings, haemolytic anemias: definition. Causes, classification and labfindings.

WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias.

Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings. Pancytopenia.

Unit- III

Basic Hematological Techniques **12 hrs**

Characteristics of good technician, Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, patient after care, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions, complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

Unit IV

Transfusion Medicine **12 hrs**

Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications.

Unit V

Clinical Pathology **12 hrs**

Introduction to clinical pathology - collection, transport, preservation, and processing of various clinical specimens.

Urinalysis - collection. Preservatives, physical, chemical examination and microscopy. Physical examination; volume, color, odor, appearance, specific gravity and ph, Chemical examination; strip method- protein - heat and acetic acid test, sulfosalicylic acid method, reducing sugar-benedicts test, ketone bodies - rotheras test, bile pigments fouchet method, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and schwartz test, bence jones protein., microscopy.

Examination of cerebrospinal fluid - physical examination, chemical examination, microscopic examination, examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination, sputum examination.

Practicals:

Laboratory organization-

Reception of specimen, dispatch of reports, records keeping, coding of cases.

Laboratory safety guidelines.

SI units and conventional units in hospital laboratory.

Haematology techniques

Basic requirements for hematology laboratory

Glasswares forhematology

Equipments for haematology.

Anticoagulant vials

Complete blood counts.

Determination of haemoglobin.

RBC count and TLC by hemocytometer.

Differential leukocyte count.

Determination of platelet count

Determination of ESR and PCV.

Erythrocyte Indices - MCV, MCH, MCHC.

Reticulocyte count

Absolute eosinophilic count

Morphology of blood cells

Urinanalysis

Examination of cerebrospinal fluid

Examination of body fluids (pleural, pericardial, peritoneal)

Sputum examination.

Practical Examination- 40 marks.

Spotters- 10 marks.

Estimation of Haemoglobin or blood grouping- 10 marks.

Urine analysis- 10 marks.

Determination of ESR and PCV- 10 marks.

1.Recommended Books Recent Editions.

1. Basic Pathology Robbins Saunders, an imprint of Elsevier Inc., Philadelphia, USA.
2. Text book of Pathology Harsha Mmohan Jaypee Brothers, New Delhi.
3. Practical Pathology P. Chakraborthy, Gargi Chakarborty New Central book agency, Kolkata.
4. Text book of Haematology Dr Tejinder Singh Arya Publications, Sirmour (H P)
5. Text book of Medical Laboratory Technology Praful Godkar Bhalani Publications house, Mumbai.
6. Textbook of Medical Laboratory Technology Ramanik Sood.
7. Practical Haematology Sir John Dacie Churchill Livingstone, London.
8. Todd and Sanford, Clinical Diagnosis and Management by Laboratory
9. Methods John Bernard Henry, All India Traveller Bookseller.
10. Histopathology Techniques, Culling.
11. Histopathology Techniques Bancroft.
12. Diagnostic Cytopathology Koss.
13. Diagnostic Cytopathology Winfred Grey.
14. Hand book of Medical Laboratory Technology, CMC Vellore.
15. Basic Haematological Techniques Manipal.

II Semester
Core 5- Microbiology
Theory

Unit - I

General Microbiology **12 hrs**

1. Morphology and classification of microorganisms.
2. Growth, nutrition and multiplication of bacteria
3. Sterilization and Disinfection - Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants
4. Immunology - antigen, Antibodies, Immunity, vaccines, types of vaccine and immunization schedule.
5. Hospital acquired infection - Causative agents, transmission methods, investigation, prevention and control of hospital Acquired infections.

Unit - II

Bacteriology **12 hrs**

Classification of bacteria, morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium diphtheriae, Clostridia, Enterobacteriaceae - Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas and Spirochetes

Unit III

Mycobacteriology & Parasitology **12 hrs**

Mycobacteria- classification, pathogenesis, lab diagnosis and prevention

Classification, infections and lab diagnosis of following parasites. Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

Unit IV

Mycology **12 hrs**

Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (Aspergillus, Zygomycetes and Penicillium)

Unit V

Virology **12 hrs**

General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies and Poliomyelitis.

Practicals: 20 hours

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, MacConkey agar with LF & NLF, Nutrient agar with staph colonies.Anaerobic culture, Methods and Antibiotic susceptibility test.
3. Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV, Hbsag and HCV.
4. Grams staining.
5. Acid fast staining.
6. Principles and practice of Biomedical waste management.
7. Stool Microscopy.

Practical examination pattern

Spotters (10 spotters carrying 2 marks each) 20 marks

Culture media - 6

Equipments - 2

Slides - 2

Discussion:

1. Gram stain 10 marks
2. Ziehl - Neelsen stain 10 marks

Recommended Books Recent Editions.

1. Anathanarayana & Panikar: Medical Microbiology - Revised 8th edition University Press.
2. Parasitology by Chatterjee - Interpretation to Clinical Medicine.
3. Textbook of Microbiology - Baveja, 5th edition, Arya Publications
4. Textbook for Laboratory technicians by RamnikSood. Jaypee Publishers
5. Textbook of Parasitology by Paniker. 7th edition

II Semester
Core - 6 - Pharmacology

Unit I

General Pharmacology, ANS, PNS. **12 Hrs**

Sources of Drugs
Route of drug administration
Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion)
Pharmacodynamics (Mechanisms of action)
Adverse drug reactions
ANS : ADRENERGIC Drugs - Adrenaline, Noradrenaline, Ephidrine, Dopamine, Dobutamine
Anti adrenergic - Phentolamine, Phenoxybenzamine, Prazocin, Tamsulosin, Propranolol, Atenolol, Carvidelol
Cholinergic drugs-Acetyl choline, Pilocarpine, Neostigmine, Organophosphorous compounds
Anti cholinergic agents-Atropine, Glycopyrrolate, Ipratropium Bromide, Dicyclomine

Unit II

PNS, CVS, Renal System **12 hrs**

Skeletal muscle relaxants - D Tubocurarine, Succinyl choline, Diazepam, Dantroline
Local anaesthetics - lignocaine, la + vasoconstrictor
CVS - ionotropic agents - Digoxin,
Antianginal drugs - GTN,
Antihypertensives - Betablockers (Propranolol, Atenolol, carvidelol), CCBs (Nifedeine), Diuretics (Thiazide, Furesemide, ace inhibitors, ARBs, Clonidine
Drugs used in treatment of different types of shock, Plasma expanders
Renal system - Diuretics Furosemide, Thiazide, Spiranolactone
Antidiuretics - Vasopressin

Unit III

CNS, Blood **12 hrs**

CNS - general Anaesthetics - nitrous oxide, Halothane, iv anaesthetics
Sedative hypnotics - diazepam, barbiturates, zolpidem
Antiepileptics - Phenytoin, carbamezapine, phenobarbitone, valproate
Opioid analgesics - morphine, pethidine, codiene
NSAIDS - Aspirin, Diclofenacibuprofen, Selective COX2 inhibitors
Respiratory system-treatment of cough And Bronchial asthma
Blood - Hematinics, Anticoagulants - Warfarin, Heparin
Thrombolytics & Antiplatelet drugs - streptokinase,/ aspirin, clopidogrel

Unit IV

GIT, Chemotherapy **12 hrs**

GIT - drugs used in peptic ulcer - ppi, H2 blockers, Antacids
Antiemetics - Metaclopromide, Domperidone, Ondensetron
Purgatives & Laxatives-bran, ispaghula, Lactulose, Bisacodyl &senna
Drugs used in Diarrhoea- ORS, Super ORS, Antimotility drugs (loperamide, diphenoxylate)
Chemotherapy - general considerations MOA, Resistance, Prophylaxis
Sulfonamides, cotrimoxazoles, Quinolones
Tetracyclines, chloramphenicol
Betalactam antibiotics

Unit V

Chemotherapy, Hormones. **12 hrs**

Aminoglycosides
Macrolides, other antibiotics (vancomycin, linezolid) & treatment of UTI
Antifungal (clotrimazole, flucanozole)
Antiviral (Acyclovir, Few drugs used in HAART,)
Cancer chemotherapy
(names, common Adverse effects, general principles in the treatment of cancer)
Hormones - Corticosteroids its uses and adverse effects,
Treatment of Diabetes mellitus(insulin, Metformin, Glibenclamide)

Practicals Syllabus : -20 hrs

Dosage forms
Solid Dosage forms
Liquid Dosage forms
Gaseous Dosage forms
Oral route
Parentral routes
Novel routes
Fixed dose combination - Amoxycillin + clavulinic acid - cotrimoxazole, Lignocaine + Adrenaline
Drug stations - Adrenaline, dopamine, Dobutamine)
Drug stations - Corticosteroids (hydrocortisone, prednisalone, inhaltional steroids)
Drug stations - common antibiotics (amoxycillin, ciprofloxacin, Azithromycin, Metronidazole, Cephalosporins)
Drug stations - Insulin preparations
Instrument & devices (Nasogastric tube, laryngoscope, Different Cathetors, nebulizers, Inhalers, Rotahalers)

Practical examination : 40 marks

1. Dosage Forms : 15 Marks (5 X 3)

Capsules, Tablets, Syrup, Iv, Im, Sc, Ia, Intra Articular -
Advantages (1 Mark), Disadvantages (1 Mark) Examples (1 Mark)

2. Mention the name of the Device / Instruments and uses : 15 marks (5X3)
   Inhalares, Rotahalers, Spacehalers, Dripsets, Vasofix, ryles tube, urinary catheter, Endotracheal tube, Hand gloves
3. 10 Spotters : 10 marks (10X 1) 2 uses of preparation

Recommended Books Recent Editions.

1. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, Emca House, 23/23, Bansari Road, Daryaganj, New Delhi.
2. Padmaja Udaykumar -Pharmacology for Allied Sciences.
3. R.S. Satoskar, S.D. Bhandarkar, S.S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th edition, Single Volume, M/s Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.

II Semester
Allied - 1 Health Care

Learning Objectives

1. To define Health and understand various concepts of Health
2. To know the Health care delivery system in India
3. To know various National Health Programmes of India
4. To have overview of First Aid Principles and guidelines

Unit I

1a Concepts of Health

Definition of health; evolution in concepts of public health; public health events-sanitary awakening, germ theory of disease, rise of public health in various countries, changing concepts of health- biomedical concept, ecological concept, psycho-social concept and holistic concept.

1b. Dimensions of Health

Physical dimension, mental dimension, Social dimension etc; Common health problems in India - Communicable diseases, Non communicable diseases, MCH problems, Nutritional problems, Environmental sanitation, Glance over National Health profile.

Unit II

2a Evolution of health care delivery systems

History of health care delivery services; Genesis of primary health care; National health policy; MDGs.

2b Levels of health care

Primary health care, secondary health care, tertiary health care.

Primary health care-principles of primary health care, elements of primary health care.

Unit III

3a Primary health care: Delivery of services

Introduction; Structure of health care delivery system; Delivery of primary health care services at village level; Village health guide, ASHA, ICDS: Subcentre: Primary health centre.

3b Secondary and tertiary health care: Delivery of services

Community Health centre; First referral unit; District hospital.

Unit IV

4a Primary health care - Current status in India

Status of health care infrastructure; Health team concept; Health insurance; Social security and social assistance in health; AYUSH.

4b National Health Programmes

Introduction; National Vector Borne Disease Control Programme; National Leprosy Eradication Programme; Revised National Tuberculosis Control

Programme; National AIDS Control Programme; Universal Immunization Programme; National Rural Heath Mission.

Unit V

5a National Health Programmes

Reproductive and Child Health Programme; Integrated Management of Neonatal and Childhood Illnesses; National Nutritional Anemia Prophylaxis Programme; National Programme for Control of Blindness; National Cancer Control Programme; National Mental Health Programme.

5b First aid

Basic terminologies; general guidelines; first aid in specific situations; Wound, bleeding, fracture, choking, burns, epistaxis, strains and sprain, animal bites (classification, causes and first aid), Cardio-pulmonary resuscitation

Recommended Books Recent Editions.

1. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers, 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 4th edition
3. Bhalwar R editor. Textbook of Public Health and Community Medicine. 2nd Pune, Department of Community medicine AFMC; 2012
4. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015

II Semester
Allied -2- Psychology

Objective
After studying this applied paper, at the end of the semester students shall be able to demonstrate and develop the skills to understand patients better in the respective field.

Unit -I
Introduction to Psychology; Meaning and Definitions psychology. Evolution of modern psychology. Scope of Psychology. Branches of psychology. Concept of normality and abnormality.

Unit -II
Identifying psychological disorders. Anxiety disorders (panic, phobia, OCD, PTSD signs symptoms and management).

Unit -III
Stress, Hans Selye Model of stress. Lazarus and Folkman model of stress. Sources of stress. Stress, disease and health. Changing health- impairing behavior.

Unit-IV
Learning; Meaning, definition, Theories of learning .Pavlov's classical conditioning .Skinner's operant conditioning.

Unit-V
Therapeutic Techniques. Counselling-meaning and definition.
Psychotherapy- meaning and definition. Relaxation-types. (Brief introduction to psychoanalytical, behavioral and cbt techniques)

Recommended Books Recent Editions.

1. C.P. Khokhar (2003) Text book of Stress Coping and Management Shalab Publishing House.
2. S.M.Kosslyn and R.S.Rosenberg (2006) Psychology in Context. Pearson Education Inc.
3. C.R. Carson, J.N. Bitcher, S.Mineka and J.M. Hooley (2007), Abnormal Psychology13th, Pearson Education, Inc.
4. D.A. Barlow and V.M. Durand (2004) Abnormal Psychology Wadsworth, Thompson Learning, 3rd edition USA.
5. R.J . Gerrig & P.G. Zimbardo (2006) Psychology and life, Pearson Education, Inc.
6. Pestonjee, D.M. (1999). Stress & Coping, The Indian Experience 2nd edn. New Delhi, Sage India Publications.

B.Sc. Optometry
III Semester
Core-7- Ocular Anatomy, Physiology and Biochemistry

Unit I **12hrs**

Ocular Anatomy I

Embryology to be aware of the three germinal layers and the important structure derived from them

To be able to identify the structure

To grossly know its relationship to surrounding structure

To be able to grossly mention the parts of the structure

To know about the function of the structure

1. Embryology of the eye in general
2. Orbit and its immediate relations
3. Lids and eye lid glands
4. Conjunctiva.
5. Cornea and Sclera
6. Iris and Ciliary Body
7. Lens and Vitreous Retina & Choroid

Unit II

Ocular Anatomy II

12hrs

8. Retina & Choroid
9. Ocular Muscles
10. Visual Pathways
11. Sympathetic and Parasympathetic System
12. Vascular Supply of Eye
13. Lacrimal Apparatus
14. Higher Visual Centres

Unit III

Ocular Physiology I **12hrs**

To be able to define the process wherever applicable

To be able to mention the factor/ theories responsible for the process

1. General physiology of the eye - an introduction
2. Maintenance of transparency of the cornea
3. Maintenance of transparency of the lens
4. Visual acuity and form sense
5. Pupillary reflexes
6. Accommodation
7. Convergence

Unit IV

Ocular Physiology II **12hrs**

8. Intra Ocular Pressure
9. Night Vision
10. Colour Vision
11. Visual Fields
12. Extrinsic Muscles, Actions and Ocular Movements
13. Higher Visual Centres and Righting Reflexes
14. Electrophysiological Aspects
15. Conjugate and Disjugate -Movements of the Eye

Unit V

Ocular Biochemistry **12hrs**

A gross overview of the following with general awareness of the pathway involved

1. Introduction to Various Biochemical Tests
2. Tears Film and PH
3. General Introduction to Metabolic Processes Affecting the Eye
4. Rhodopsin Cycle
5. Aqueous and Vitreous Humor
6. Metabolism of Lens and Cornea.

Practicals:

Ocular Anatomy

1. Dissection of Animal Eye/Cadaver Eye
2. Demonstration with plastinated specimen
   - Eye,
   - Extra-ocular muscles,
   - Bony orbit,
   - Orbit in relation to surrounding structures (sections),
   - Visual pathway
3. Demonstration with model eye

Ocular Physiology

1. Visual acuity
2. Colour vision
3. Visual fields
4. IOP
5. Extra-ocular muscles
   - Action
   - Movements (uniocular, binocular)
   - Conjugate/disjugate
   - Testing of muscles
   - Diplopia charting
   - Accomodation
   - Electrophysiology

Ocular Biochemistry

1. Tests

Sampling and collection of blood
Blood sugar, cbg
Urine sugars, albumin, ketone bodies
Tear film ph
Spectrophotometry
Serum-cholesterol

Practical Exam- 40 marks

1. To demonstrate the parts of the eye and visual system on a specimen-10 Marks
2. To demonstrate the testing of the following-20 marks
    1. Visual acuity
    2. Colour vision
    3. Visual fields
    4. iop
    5. Extra-ocular musclesaction

3. To demonstrate urine sugar, urine protein and CBG-10 marks

Recommended Books and Reference Books:

Ocular Anatomy

1 L A Remington, Clinical Anatomy of 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.

Ocular Physiology

1. AK Khurana, InduKhurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006.

2 RD Ravindran, Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001

3 PL Kaufman, A Alm, Adler's Physiology of the eye clinical application, 10th ed. Mosby, 2002.

Ocular Biochemistry

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

2 S. Ramakrishnan, K G Prasannan and R Rajan, Text book of Medical Biochemistry, Orient Longman, Madras, 1990.

3 D.R. Whikehart, Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

III Semester
Core 8 -Physical Optics

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

1. Introduction -Light, Mirror, Reflection, Refraction and Absorption
2. Prisms -Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotaryprisms
3. Lenses -Definition, units, terminology used to describe, form of lenses
4. Vertex distance and vertex power, Effectivity calculations
5. Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical
6. Transpositions -Simple, Toric and Spherical equivalent
7. Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinderlenses
8. Spherometer& Sag formula, Edge thickness calculations
9. Magnification in high plus lenses, Minification in high minus lenses
10. Tilt induced power in spectacles
11. Aberration in Ophthalmic Lenses

Unit 1
Elementary Basics Of Light **12 hrs**

1. Nature of light -light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index
2. Sources of light; Electromagnetic Spectrum
3. Polarized light; linearly polarized light; and circularly polarized light
4. Intensity of polarized light; Malus' Law; polarizers and analysers; Methods of producing polarized light; Brewster's angle
5. Wavefronts- spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance
6. Reflectivity; transmissivity; Snell's Law, Refraction at a plane surface
7. Refractive index; its dependence on wavelength
8. Fermat's and Huygen's Principle -Derivation of laws of reflection and refraction (Snell's law) from these principles

Unit II **12 hrs**

1. Plane mirrors -height of the mirror; rotation of the mirror
2. Reflection by a spherical mirror -paraxial approximation; sign convention; derivation of vergence equation
3. Imaging by concave mirror, convex mirror
4. Glass slab; displacement without deviation; displacement without dispersion

5. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism
6. Prisms; angular dispersion; dispersive power; Abbe's number
7. Definition of crown and flint glasses; materials of high refractive index
8. Thin prism -definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index

Unit III **12 hrs**

1. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula
2. Paraxial approximation; derivation of vergence equation
3. Imaging by a positive powered surface and negative powered surface
4. Vergence at a distance formula; effectivity of a refracting surface
5. Definition of a lens as a combination of two surfaces; different types of lens shapes
6. 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
7. Newton's formula; linear magnification; angular magnification
8. Nodal Planes

Unit IV **12 hrs**

1. Thin lens as a special case of thick lens; review of sign convention
2. Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
3. Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
4. Spherical, Cylindrical &Toric Surfaces, Aspheric Surfaces
5. Determination Of Focal Length & Dioptric Power Of Lens
6. Sturm's Conoid
7. Prentice's Rule
8. System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.

Unit V **12 hrs**

1. System of more than two thin lenses; calculation of equivalent power using magnification formula
2. Prismatic Effect &Decentration
3. Aberrations & Tints In Spectacle Lenses
4. Coherence; interference; constructive interference, destructive interference; fringes; fringe width

5. Diffraction; diffraction by a circular aperture; Airy's disc
6. Resolution of an instrument (telescope, for example); Raleigh's criterion
7. Fluorescence and Phosphorescence
8. Basics of Lasers - coherence; population inversion; spontaneous emission; Einstein's theory of lasers.

Practicals

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.

Practical Exams - 40 Marks

1. Convex lens - power determination - 10 MARKS
2. Concave lens - power determination - 10 MARKS
3. Spherocylindrical lens - powerdetermination - 10 MARKS
4. Prism - power determination - 10 MARKS

Reference Books (latest edition)

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

Reference Books:

1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.
3. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
4. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

III Semester
Core 9- Refraction

Unit I **12hrs**

1. Schematic Eye
2. Emmetropia & Ametropia -Aetiology, Population, Distribution, Growth of Eye
3. Myopia
4. Hypermetropia
5. Astigmatism

Unit II **12hrs**

1. Aphakia/Pseudo-Phakia
2. Presbyopia
3. Keratoconus
4. Post-Op. Refractive Errors

Unit III **12hrs**

1. Refraction of Irregular Reflex
2. Accommodation & Convergence
   a) Accommodation & presbyopia
   b) Far and near point of accommodation
   c) Range and amplitude of accommodation
   d) Mechanism of accommodation
   e) Variation of accommodation with age
   f) Anomalies of accommodation
   g) Presbyopia
   h) Hypermetropia and accommodation

3 Vergence type, measurement and anomalies

4. Accommodation & Convergence -two Methods of Measurements, NPA.AC/A Ratio.
5. Retinoscopy -Principle & Methods, theory about reflex and movements

Unit IV **12hrs**

Objective Refraction

a) Objective refraction (static & dynamic)
b) Streak retinoscopy
c) Principle, procedure, difficulties and interpretation of findings
d) Transposition and spherical equivalent
e) Dynamic retinoscopy various methods
f) Radical retinoscopy and near retinoscopy
g) Cycloplegic refraction

Unit V **12hrs**

Subjective refraction:

1. Principle and fogging
2. Fixed astigmatic dial (clock dial), combination of fixed and rotator dial (fan and Block test), j.c.c
3. Cross Cylinder
4. Duochrome test
5. Binocular balancing- alternate occlusion, prism dissociation
6. Duochrome balance, borish dissociated fogging
7. Binocular refraction-various techniques
8. Effective power & magnification:
9. Ocular refraction vs. Spectacle refraction
10. Spectacle magnification vs. Relative spectacle magnification
11. Axial vs. Refractive ammetropia, knapp's law
12. Ocular accommodation vs. Spectacle accommodation
13. Retinal image blur-depth of focus and depth of field

Practical

1. Refraction and prescription of glasses in OPD
2. Use of accessories in refraction room

Practical Examination: 40 marks

1. Refraction and prescription of glasses in OPD - 20 marks
2. Demonstration of use of all the accessories in the refraction room - 20 marks

Reference Books (latest edition)

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

III Semester
Skill Enhancement-1
Computer Application

1 Overview

- Functionalities of a computer
- Definition
- Advantages
- Disadvantages

2 Applications

- Banking
- Insurance
- Education
- Marketing
- Health Care
- Engineering Design
- Military
- Communication
- Government

3 Generations

- First Generation
- Second Generation
- Third Generation
- Fourth Generation
- Fifth Generation

4 Types of Computer

- PC (Personal Computer)
- Workstation
- Minicomputer
- Mainframe
- Supercomputer

5 Components

- Input Unit
- CPU (Central Processing Unit)
- Output Unit

6 CPU - Central Processing Unit

- Memory or Storage Unit
- Control Unit
- ALU (Arithmetic Logic Unit)
- Arithmetic Section
- Logic Section

7 Input Devices

- Keyboard
- Mouse
- Advantages
- Joystick
- Light Pen
- Track Ball
- Scanner
- Digitizer
- Microphone
- Magnetic Ink Card Reader(MICR)
- Optical Character Reader(OCR)
- Bar Code Readers
- Optical Mark Reader(OMR)

8 Output Devices

- Monitors
- Cathode-Ray Tube (CRT) Monitor
- Flat-Panel Display Monitor
- Printers
- Impact Printers
- Character Printers
- Dot Matrix Printer
- Daisy Wheel
- Line Printers
- Drum Printer
- Chain Printer
- Non-impact Printers
- Laser Printers
- Inkjet Printers

9 Memory

- Cache Memory
- Primary Memory (Main Memory)
- Secondary Memory

10 Random Access Memory

- Static RAM (SRAM)
- Dynamic RAM (DRAM)

11 Read Only Memory

- MROM (Masked ROM
- PROM (Programmable Read only Memory)
- EPROM(Erasable and Programmable Read Only Memory)
- EEPROM (Electrically Erasable and Programmable Read Only Memory)
- Advantages of ROM

12 Mother board

- Features of Mother board
- Popular Manufacturers
- Description of Mother board

13Memory Units

14Ports

- Serial Port
- Parallel Port
- PS/2 Port
- VGA Port
- Power Connector
- Firewire Port
- Modem Port
- Ethernet Port
- Game Port
- Digital Video Interface, DVI port
- Sockets

15Hardware

- Relationship between Hardware and Software

16Software

- System Software
- Application Software

17Number System

- Decimal Number System
- Binary Number System
- Octal Number
- Hexadecimal Number System

18Data and Information

- Data Processing Cycle

19Networking

- Characteristics of Computer Network
- Cables
- Router
- Network Card
- Internal Network Cards
- External Network Cards

20Operating System

- Objectives of Operating System
- Characteristics of Operating System

21Internet and Intranet

- Similarities in Internet and Intranet
- Differences in Internet and Intranet

22Computer Viruses

- Types of computer virus
- Use of Antivirus software

Practicals:

Suggested Hands on Exercises

Operating System:

1. Starting the Windows Starting a program, running a program Running multiple programs and switching between windows Customizing the Task bar Recycle bin, restoring the deleted files
2. Creating and removing folders Making the taskbar wider, arranging icons on the Desktop Displaying and hiding the taskbar clock Controlling the size of start menu options Creating Shortcuts.
3. Customizing desktop view Adding a program to the start menu Adding a program shortcut in the Desktop Customizing the mouse settings
4. Expanding and collapsing a folder Recognizing File types using icons Running a program from explorer Renaming a file or folder Sorting a folder
5. Displaying the properties for a file or folder Using cut and paste operations to move a file Using copy and paste operations to copy a file Moving and copying files with mouse Searching a file or folder by using search command
6. Finding a file or folder, by name Defragmenting the disk, using disk defragmenter Controlling the speaker volume Recording and saving an audio file Connecting a printer to the PC

Word Processing:

1. Preparing a Govt. Order / Official Letter / Business Letter / Circular Letter Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.
2. Preparing a news letter: To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout.
3. Creating and using styles and templates To create a style and apply that style in a document To create a template for the styles created and assemble the styles for the template.
4. Creating and editing the table to create a table using table menu To create a monthly calendar using cell editing operations like inserting, joining, deleting, splitting and merging cells To create a simple statement for math calculations viz. Totaling the column.
5. Creating numbered lists and bulleted lists To create numbered list with different formats (with numbers, alphabets, roman letters) To create a bulleted list with different bullet characters.
6. Printing envelopes and mail merge. To print envelopes with from addresses and to

addresses To use mail merge facility for sending a circular letter to many persons To use mail merge facility for printing mailing labels.

7. Using the special features of word To find and replace the text To spell check and correct. To generate table of contents for a document To prepare index for a document.

8 Create an advertisement Prepare a resume. Prepare a Corporate Circular letter inviting the shareholders to attend the Annual Meeting.

Work Sheet:

1. Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branch offices (Showing Total Sales, Average Sales). Prepare a Statement for preparing Result of 10 students in 5 subjects (using formula to get Distinction, I Class, II Class and Fail under Result column against each student).
2. Operating on the sheets: Finding, deleting and adding records, formatting columns, row height, merging, splitting columns etc. Connecting the Worksheets and enter the data.
3. Creating Different type of Charts: To create a chart for comparing the monthly sales of a company in different branch offices.
4. Using the data consolidate command: To use the data consolidate command to calculate the total amount budgeted for all departments (wages, travel and entertainment, office supplies and so on) or to calculate the average amount budgeted for - say, department office expenses.
5. Sorting Data, Filtering Data and creation of Pivot tables.

Presentation::

1. Creating a new Presentation based on a template - using Auto content wizard, design template and Plain blank presentation.
2. Creating a Presentation with Slide Transition - Automatic and Manual with different effects.
3. Creating a Presentation applying Custom Animation effects - Applying multiple effects to the same object and changing to a different effect and removing effects.
4. Inserting Objects Creating and Printing handouts.
5. Publishing Presentation Exporting Presentations.

Internet:

1. Understanding different types of Browser Programs and Internet file types. (.html, pdf etc.)
2. Searching for a web site / application / text documents viewing and downloading.
3. Create an E-mail account, Retrieving messages from inbox, replying, attaching files filtering and forwarding
4. Operating on a Tablet / Smart Phone - browsing and practicing on some important applications (UcBrowser, Skype) - operating on internet - creating and sending messages / mails using the applications like WhatsApp and We Chat etc.- downloading text and media files and video conferencing using Skype.

III Semester

Allied-3- Environment Science and Health

Learning Objectives

1. To know various Environmental factors Health
2. To learn the modes of disease transmission and various control measures

Unit I

1. a. Introduction to Environment and Health and Water

Ecological definition of Health, Population perspective of relations, Health & environment perspective of relations, Environmental factors, Environmental Sanitation, Need to study environmental health, Predominant reasons for ill-health in India

1.b. Water

Safe and wholesome water, requirements, uses, sources; sanitary well; Hand pump; water Pollution; Purification of water; large scale & small scale; slow sand filters; rapid sand filters; Purification of Water on a small scale; Household purification, Disinfection of wells; water quality criteria & standards.

Unit II

Air, Light, Noise, Radiation

2 a. Air

Composition, Indices of Thermal Comfort, Air pollutants, Air Pollution - Health Effects, Environmental Effects, Green-house effect, Social & Economic Effects, Monitoring, Prevention & Control.

2. b. Light, Noise, Radiation

Natural and Artificial light; Properties, sources, noise pollution and its control, types, sources, biological effects and protection.

Unit III

Waste and Excreta Disposal

3 a. Disposal of Wastes

Solid Wastes, Health hazards, Methods of Disposal; Dumping, Controlled tipping/ sanitary landfill, Incineration, Composting.

3 b. Excreta Disposal

Public health importance, Health hazards, sanitation barrier, Methods of excreta disposal, unsewered areas and sewered areas, sewage, Modern Sewage Treatment.

Unit IV

Housing and Health and Medical Entomology

4 a. Housing and Health

Human Settlement, Social goals of housing, Criteria for Healthful Housing by Expert Committee of the WHO, Housing standards- Environmental Hygiene Committee, Rural Housing Standards, Overcrowding, Indicators of Housing.

4 b. Medical Entomology

Classification of Arthropods, Routes of Disease transmission, Control measures.

Unit V

Insecticides and Rodents

5 a. Insecticides

Types, mechanism of action, dosage and application for control of insects.

5 b. Rodents

Rodents and its importance in disease, along with anti-rodent measures.

Reference Books (latest edition)

1. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers; 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 4th edition.
3. Bhalwar R. Textbook of Public Health and Community Medicine. 2nd edition. Pune: Department of Community Medicine AFMC, 2012
4. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015.

IV Semester
Core I0- Ocular Diseases I

Objectives:

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

1. Etiology
2. Epidemiology
3. Symptoms
4. Signs
5. Course sequelae of ocular disease
6. Diagnostic approach and
7. Management of the ocular diseases.

Unit I

Ocular Diseases **12hrs**

Orbit

1. Applied Anatomy
2. Proptosis (Classification, Causes, Investigations)
3. Enophthalmos
4. Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)
5. Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)
6. Grave's Ophthalmopathy
7. Orbital tumors (Dermoids, capillary haemangioma, Optic nerve glioma)
8. Orbital blowout fractures
9. Orbital surgery (Orbitotomy)
10. Orbital tumors
11. Orbital trauma
12. Approach to a patient with proptosis

Unit II

Ocular Diseases **12hrs**

Lids

1. Applied Anatomy
2. Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)
3. Oedema of the eyelids (Inflammatory, Solid, Passive edema)
4. Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internalhordeolum, Molluscum Contagiosum)

5. Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).
6. Tumors (Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)

Lacrimal System

1. Applied Anatomy
2. Tear Film
3. The Dry Eye (Sjogren's Syndrome)
4. The watering eye (Etiology, clinical evaluation)
5. Dacryocystitis
6. Swelling of the Lacrimal gland (Dacryoadenitis)

Unit III

Ocular Diseases **12hrs**

Conjunctiva

1. Applied Anatomy
2. Inflammations of conjunctiva (Infective conjunctivitis - bacterial, chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis)
3. Degenerative conditions (Pinguecula, Pterygium, Concretions)
4. Symptomatic conditions (Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration)
5. Cysts and Tumors

Unit IV

Ocular Diseases **12hrs**

Cornea

1. Applied Anatomy and Physiology
2. Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea)
3. Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative
4. Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic)
5. Degenerations (classifications, Arcus Senilis, Vogt's white limbal girdle, Hassle-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration)
6. 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)
7. Keratoconus, Keratoglobus
8. Corneal oedema, Corneal opacity, Corneal vascularisation
9. Penetrating Keratoplasty

Unit V

Ocular Diseases **12hrs**

Uveal Tract and Sclera

1. Applied Anatomy,
2. Classification of uveitis
3. Etiology
4. Pathology
5. Anterior Uveitis
6. Posterior Uveitis
7. Purulent Uveitis
8. Endophthalmitis
9. Panophthalmitis
10. Pars Planitis
11. Tumors of uveal tract (Melanoma)
12. Episcleritis and scleritis
13. Clinical examination of Uveitis and Scleritis

Practicals:

Case Demonstration

Practical Examination: 40 Marks

Spotters of common cases - 4 cases - 10 marks each

Text books and Reference books

Recommended Books and Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, New age international(p) Ltd. Publishers, New Delhi, 2007

Reference Books:

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

IV Semester
Core 11- Ocular Diseases 2

UNIT I

Ocular Diseases 2 **12hr**

Retina and Vitreous:

1. Applied Anatomy
2. Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery)
3. Inflammatory disorders (Retinitis : Acute purulent, Bacterial, Virus, mycotic)
4. Retinal Vasculitis (Eales's)
5. Retinal Artery Occlusion (Central retinal Artery occlusion)
6. Retinal Vein occlusion (Ischaemic, Non Ischaemic, Branch occlusion)
7. Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations
8. Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration.
9. Retinal Detachment: Rhegmatogenous, Tractional, Exudative)
10. Retinoblastoma
11. Diabetic retinopathy

UNIT II

Ocular Diseases 2 **12hrs**

Lens

1. Applied Anatomy and Physiology
2. Clinical examination
3. Classification of cataract

a. Congenital and Developmental cataract

b. Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Toxic)

c. Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar.

4. Management of cataract (Non-surgical and surgical measures)

a. Pre-operative evaluation

b. Types of surgeries

c. Complications of cataract surgery

5. Displacement of lens: Subluxation, Dislocation
6. Lenscoloboma, Lenticonus, Microsperophakia.

UNIT III

Ocular Diseases 2 **12hrs**

Glaucoma

1. Applied anatomy and physiology of anterior segment
2. Clinical Examination

3. Definitions and classification of glaucoma
4. Pathogenesis of glaucomatous ocular damage
5. Congenital glaucoma's
6. Primary open angle glaucoma
7. Ocular hypertension
8. Normal Tension Glaucoma
9. Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure, absolute glaucoma)
10. Secondary Glaucoma's
11. Management: common medications, laser intervention and surgical techniques

UNIT IV

Ocular Diseases 2 **12hrs**

Ocular Injuries:

Mechanical injuries Terminology: blunt trauma, penetrating injury

1. Closed globe injury (Extraocular foreign body, contusion, lamellar laceration)
2. Open globe injury (rupture, penetrating injury, perforating injury)
3. sympathetic ophthalmitis

Non Mechanical Injuries:

1. Chemical injuries
2. Thermal
3. Electrical
4. Radiational

Clinical approach towards ocular injury patients

UNIT V

Ocular Diseases 2 **12hrs**

Clinical Neuro-ophthalmology

1. Anatomy of visual pathway
2. Lesions of the visual pathway
3. Pupillary reflexes and abnormalities (Afferent Pupillary Defect, Wernicke's hemianopic pupil, Marcus gunn pupil, Argyll Robertson pupil, Adie's tonic pupil)
4. Optic neuritis
5. Anterior Ischemic optic neuropathy
6. Papilledema
7. Optic atrophy
8. Cortical blindness
9. Malingering
10. Nystagmus
11. Clinical examination

Practicals

Case Demonstration

Practical Examination: 40 Marks

Spotters of common cases - 4 cases - 10 marks each

Recommended Books. (latest edition)

1. A K Khurana: Comprehensive Ophthalmology, New age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books:

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

IV Semester

Core 12-Ophthalmic Instruments and Appliances

Unit I

Ophthalmic Instruments and Appliances **12hrs**

Refractive Instruments

1. Optotypes and MTF, Spatial Frequency
2. Test charts standards.
3. Choice of test charts
4. Contrast sensitivity
5. Trial case lenses
6. Refractor (phoropter) head units
7. Optical considerations of refractor units
8. Trial frame design
9. Near vision difficulties with units and trial frames
10. Jackson cross cylinderlens gauge
11. Retinoscope - types available
12. Adjustment of Retinoscopes- special features
13. Objective optometers.
14. Infrared optometer devices.
15. Projection charts
16. Refraction room standards
17. Brightness acuity test

Unit II

Ophthalmic Instruments and Appliances **12hrs**

1. Vision analyser
2. Pupilometer
3. Potential acuity meter
4. Aberometer
5. Design of ophthalmoscopes- viewing and illumination
6. Ophthalmoscope disc
7. Filters for ophthalmoscopy
8. Indirect ophthalmoscope
9. Lensometer, Lens gauges or clock
10. Slit lamp
11. Tonometers - Schiotz, Applanation, Rebound, Non-contact tonometer
12. Syringing and lacrimal function test
13. Orthoptic Instruments (Synaptophore Only)
14. Colour Vision Testing Devices
15. B-Scan

16. Fundus camera- fluorescein anigiography
17. External eye photography

Unit III

Ophthalmic Instruments and Appliances **12hrs**

1. Auto-refractometer
2. A -scan ultrasound
3. Corneal examination -1. Placido disc
4. Corneal examination -2. Keratometer
5. Corneal examination -3 v kg
6. Corneal examination -4. Specular microscopy
7. Corneal examination -5. Aesthesiometer
8. Exophthalmometer
9. Fields of vision and screening devices
10. Perimeter - manual & automate
11. Orthoptics instruments -haploscope/home devices
12. Heidelberg retino-tomography hrt -ii
13. Nerve fiberanalyzer
14. Frequency doubling perimeter
15. Heidelberg anomaloscope
16. Pachymeters
17. Contrast sensitivity tests
18. Glare acuity tests
19. Electrodiagnostic instrument (ERG, VEP, EOG)

Unit IV

Ocular Pharmacy And Pharmacology **12hrs**

1. Ocular Pharmacology - An Introduction
2. Autonomic Nervous System
3. Routes of Drug Administration
4. Miotics, Mydriatics&Cycloplegics Drugs
5. Antibacterial Drugs & Therapy
6. Antifungal Drugs & Therapy
7. Anti-Viral Drugs & Therapy
8. Anti-Inflammatory Drugs & Therapy
9. Anti-Glaucoma Drugs & Therapy

Unit V

Ocular Pharmacy and Pharmacology **12hrs**

1. Ophthalmic Dyes
2. Local Anaesthetics

3. Ophthalmic Preservatives
4. Ocular Lubricants
5. Ocular Irrigating Solutions
6. Ocular Antiseptics & Disinfectants
7. Anti-Cataract Agents
8. Contact Lens Solution
9. Chelating Agents
10. Immunosuppressive Agents

PRACTICALS- UNIT I- UNIT III

1. History taking
2. Vision testing - distant, near, contrast, illiterate, children
3. Colour vision
4. External examination of the eye, lid eversion
5. Hirschberg test, modified krimsky
6. Extra ocular motility - cover test
7. Pupils examination
8. Maddox rod
9. Van herrick
10. Schirmer's, tbut, tear meniscus level, nitbut (keratometer
11. Lensometer, lens gauge
12. Tonometer
13. Placido disc
14. Keratometer
15. Vkg
16. Specular microscopy
17. Exophthalmometer
18. Stereopsis
19. Photostress test
20. Confrontation test
21. Perimeter
22. Non-contact tonometer
23. Slit lamp: haag-streit.
24. Photo-slit lamp
25. Fundus camera
26. Syringing
27. Ophthalmoscope
28. Amslers test
29. Saccades and pursuit test

PRACTICAL- UNIT IV & V

Dilution of drug in different concentration

Practical Examination: - 40 marks

Use of all the ophthalmic instruments - 30 marks

Identification and uses of all the medications - 10 marks

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
4. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
5. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
6. T J Zimmerman, K S Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

IV Semester
Skill Enhancement-2
Biostatistics and Research Methodology

Learning Objectives

1. To have a basic knowledge of biostatistics and its applications in medicine
2. To know various types of data presentation and data summarization in Medical field
3. To have overview of data analysis and sampling techniques
4. To understand various study designs in Medical field
5. To know applications of various study designs in Medical Research

Unit I-

Introduction and Presentation of data

Meaning , Branches of Statistics, Uses of statistics in medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.

Unit II-

Measures of central tendency and Measures of Variation

Arithmetic Mean (Mean), Median, Mode, Partition values, Range, Interquartile range , Mean Deviation, Standard Deviation, Coefficient of Variation.

Unit III-

Probability and standard distributions

Definition of some terms commonly encountered in probability, Probability distributions; Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality; Skewness and kurtosis

U**nit IV-**

Census and Sampling Methods

Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience sampling, Consecutive Sampling, Quota sampling, Snowball sampling, Judgmental sampling or Purposive sampling, Volunteer sampling, Probability (Random) Sampling methods; Simple random sampling, Systematic Sampling, Stratified Sampling, Cluster sampling, Multi-stage sampling, Sampling error, Non-sampling error.

Unit V-

Inferential statistics

Parameter and statistic, Estimation of parameters; Point estimation, Interval Estimation, Testing of hypothesis; Null and alternative hypotheses, Type-I and Type-II Errors.

Research Methodology

Unit I -

Introduction to research methodology

Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, Some Other Types of Research

Unit II -
Study Designs-Observational Studies
Epidemiological study designs; Observational studies, Descriptive studies; Case reports, Case series, Analytical studies; Case control studies, Cohort studies, Cross sectional

Unit III-
Experimental Studies
Experimental studies (Interventional studies); Randomized control trials (Clinical trials), Field trials, Community trials, Nm- Randomized trials

Unit IV-
Uses of Epidemiology

Unit V-
Application of study Designs in Medical Research

References

1. K.R.Sundaram, S.N.Dwivedi and V Sreenivas (2010), Medical statistics, principles and Methods, BI Publications Pvt Ltd, New Delhi
2. NSN Rao and NS Murthy (2008), Applied Statistics in Health Sciences, Second Edition, Jaypee Brothers Medical Publishers (P) Ltd.
3. J.V.Dixit and L.B.Suryavanshi (1996), Principles and practice of biostatistics, First Edition, M/S Banarsidas Bhanot Publishers.
4. GetuDegu and Fasil Tessema (2005), Biostatistics, Ethiopia Public Health Training Initiative.
5. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.
6. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers, 2015. p.135-141.
7. Suryakantha. Textbook of Community medicine with recent advances. 4th edition.
8. Bhalwar R. Textbook of Public Health and Community Medicine. 2nd Edition. Pune, Department of Community Medicine AFMC, 2012.
9. Leon Gordis. Epidemiology Fourth Edition - Elsevier Saunders Publication.

IV Semester
Allied-4
Constitution of India

Unit - I:
Meaning of the term 'Constitution'. Making of the Indian Constitution 1946-1950.

Unit - II:
The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

Unit - III:
Fundamental rights and duties their content and significance.

Unit - IV:
Directive principles of States, policies the need to balance fundamental rights with directive principles.

Unit - V:
Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

Unit - VI:
Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India.

Unit - VII:
The Election Commission and State Public Service commissions.

Unit - VIII:
Method of amending the Constitution.

Unit - IX:
Enforcing rights through writs.

Unit - X:
Constitution and sustainable development in India.

Recommended Books:

1. J.C. Johari. The Constitution of India. A Politico-Legal Study. Sterling Publication, Pvt. Ltd. New Delhi.
2. J.N . Pandey. Constitution Law of India, Allahbad, Central Law Agency, 1998.
3. Granville Austin. The Indian Constitution. Corner Stone of a Nation-Oxford, New Delhi, 2000.

V Semester

Core-13-Clinical & Advaced Refractions, Contact Lens

Unit I-

Clinical & Advaced Refractions 12hrs

1. Emmetropia&Ametropia -Aetiology, Population, Distribution, Growth of Eye.
2. Myopia
3. Hypermetropia
4. Astigmatism
5. Aphakia/Pseudo-Phakia
6. Presbyopia
7. Keratoconus
8. Post-Op. Refractive Errors
9. Refraction of Irregular Reflex
10. Accommodation & Convergence -1. Far Point, Near Point, angle, Amplitude of Accommodation
11. Accommodation & Convergence - two Methods of Measurements, NPA, AC/A Ratio.
12. Retinoscopy -Principle & Method
13. Objective Refraction
14. Subjective Refraction
15. Cross Cylinder

UNIT II -

Contact Lens I **12hrs**

1. Introduction to contact lenses
2. Definition
3. Classification / types
4. History of contact lenses
5. Optics of contact lenses
6. Magnification & visual field
7. Accommodation & convergence
8. Back & front vertex power / vertex distance calculation

UNIT III -

Contact lens-II **12hrs**

1. Review of anatomy & physiology of tear film and cornea
2. Lids & conjunctiva
3. Introduction to CL materials

4. Monomers, polymers
5. Properties of CL materials
6. Physiological (dk, ionicity, water content)

UNIT IV -

Contact Lens-III **12hrs**

1. Physical (elasticity, tensile strength, rigidity) 2. Optical (transmission, refractive index)
3. Indications and contraindications
4. Parameters / designs of contact lenses & terminology
5. RGP contact lens materials
6. Manufacturing rigid and soft contact lenses - various methods

UNIT V -

Contact Lens-IV **12hrs**

1. Pre-fitting examination - steps, significance, recording of results
2. Preliminary measurements and investigations
3. Slit lamp biomicroscopy
4. Keratometry, placido's disc, tomography
5. Fitting philosophies
6. Fitting of spherical SCL and effect of parameter changes
7. Astigmatism correction options
8. Fitting spherical rgp contact lenses, low dk, high dk
9. Effects of rgp contact lens parameter changes on lens fitting

Practicals- A. Clinical and Advanced refractions

Refraction and prescription of glasses

Demonstration of use of all the equipment's in the refraction room

Practicals-B-Contact Lens

1. Measurement of ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and tbut
4. Schrimers test, slit lamp examination of tear layer
5. Keratometry
6. Placido's disc
7. Soft contact lens fitting - aspherical
8. Soft contact lens fitting - lathecut lenses
9. Soft contact lens over refraction
10. Lens insertion and removal

11. Lens handling and cleaning
12. Examination of old soft lens
13. RGP lens fitting
14. RGP lens fit assessment and fluorescein pattern
15. special RGP fitting (aphakia, pseudo phakia& keratoconus)
16. RGP over refraction and lens flexure
17. examination of old RGP lens
18. RGP lens parameters
19. slit lamp examination of contact lens wearers

Practical Examination- 40 marks

1. Refraction and prescription of glasses - 20 marks
2. Demonstration of use of all the equipment's in the refraction room - 5 marks
3. Ocular measurements including keratometry - 10 marks
4. Fitting of contact lens and post fitting management - 5 marks

Recommended Books and Reference Books:

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

V Semester

Core 14 - Clinical and Advanced Orthoptics

UNIT I

Orthoptics **12 hrs**

1. Orthoptic-General Concept
2. Ocular Muscles and Movements
3. AC/ A Ratio.
4. Measurements of Angle of Squint
5. Latent Squint

UNIT II

Orthoptics **12hrs**

1. Maddox Rod
2. Maddox Wing
3. Synaptophore
4. Manifest ConcomitantSquint

UNIT III

Orthoptics **12hrs**

1. Paralytic Squint
2. Head Posture and Its Significance
3. Hess Screening and Its Interpretations
4. Pleoptics
5. Occlusion -Types and Uses

UNIT IV

Orthoptics **12hrs**

1. Nystagmus
2. A. V. Syndromes
3. Testing of ARC
4. Amblyopia
5. Disorders of Accommodation

UNIT V

Orthoptics **12hrs**

1. Paediatric Visual Acuity Assessment
2. Paediatric Refraction
3. Neural Aspects of Binocular Vision

Practical

1. Manifest squint work-up
2. Paralytic squint work-up
3. Pleoptics
4. Orthoptic Exercises

Practical Examination: 40 marks

Case spotters - 2 - 20 marks each

Recommended Books:

1. A.k. Khurana Textbook of Squint and Orthoptics
2. Pradeep Sharma: Strabismus Simplified, New Delhi, First edition Modern Publication1999.
3. Fiona J. Rowe: Clinical Orthoptics, Second edition, 2004, Blackwell Science Ltd
4. Gunter K. V. Mosby Company
5. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

V Semester

CORE 15 - Community Ophthalmology, Low Vision Careand Eye bank

UNIT I -

Community Ophthalmology and Eye Bank I **12hrs**

1. Concepts of Community Ophthalmology - I
2. Concepts of Community Ophthalmology - II
3. The Epidemiology of Blindness (Generalprinciples) - I
4. The Epidemiology of Blindness (Generalprinciples) - II
5. The Epidemiology of Blindness (Disease Specific Strategies) - III
6. The Epidemiology of Blindness (Disease Specific Strategies) - IV
7. Survey Methodological - I
8. Survey Methodological - II
9. Survey Methodological - III

UNIT II-

Community Ophthalmology and Eye Bank II **12hrs**

1. Screening Procedures in Ophthalmology - I
2. Screening Procedures in Ophthalmology - II
3. School Eye Screening Programme
4. Primary Eye Care
5. Organization of Outreach Services
6. Organization of Reach-in-Programme
7. Information, Education, Communication
8. Rehabilitation of The Visually Handicapped
9. National Programme for Control of Blindness - I
10. National Programme for Control of Blindness - II
11. Vision 2020: The Right to Sight

UNIT III-

Community Ophthalmology and Eye Bank III **12hrs**

1. Nutritional blindness with reference to vitamin a deficiency
2. Role of an optometrist in public health
3. Organization and management of eye care programs - service delivery models
4. Health manpower and planning & health economics
5. Evaluation and assessment of health programmes
6. Optometrists role in school eye health programmes
7. Basics of tele optometry and its application in public health

UNIT IV-

Low Vision Care **12hrs**

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

UNIT V-

Eye Bank **12hrs**

1. Publicity
2. How to Donate your Eyes
3. Collection of Eyes
4. Preservation of Eyes
5. Pre-Operative Instructions
6. Post-Operative Instructions
7. Latest Techniques for Preservation of Donor Cornea

Practicals

a. Community Ophthalmology and Eye Bank

1. Eye Screening Programme & Surveys
2. Eye camp

b. Low Vision Care

1. Attending in low vision care clinic and history taking.
2. Determining the type of telescope and its magnification (direct comparison method & calculated method)
3. Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.
4. Inducing visual impairment and prescribing magnification.
5. Determining reading speed with different types of low vision aids with same magnification.
6. Determining reading speed with a low vision aid of different Magnifications.

c. Eye Bank

1. How to donate your eyes/Counselling
2. Collection of eyes
3. Preservation of eyes

Practical Examination: 40 marks

Identification of storage media - 10 marks

Identification of instruments related to collection of eye - 10 marks

Identification of food products rich in vitamin A- 10 marks

Low visual aid spotters - 10 marks

Recommended Books and 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, Jolleyjl : Public health and community optometry, Charles CThomas publisher, Illinois, 1980
3. K Kark. Park's Text book of preventive and social medicine, 19th edition, banarsidasbhanot publishers, Jabalpur, 2007
4. Christine Dickinson: low vision: principles and practice low vision care, 4th edition, Butterworth- heinemann, 1998
5. Sarika G, Sailaja MV Sevaithilingam: practice of low vision -a guide book, medical research foundation, 2015.
6. Parsons Textbook of ophthalmology
7. A.K.Khurana comprehensive Textbook of ophthalmology

Reference Books:

1. MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002
2. Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
3. Helen Farral: Optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
4. A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

V Semester
Elective-1- Telemedicine

Offering department:

Dermatalogy

Objective:

To make the student aware that Telemedicine is the use of telecommunication and information technology to provide clinical health care at adistance.It helps eliminate distance barriers and improves access to medical services

1. Introduction to healthcare delivery system and to use telemedicine to integrate the system
    a) Healthcare delivery system in india at primary, secondary and tertiary care
    b) Community participation in healthcare delivery system
    c) Health system in developed countries.
    d) Private sector
    e) National health mission
    f) National health policy
    g) Issues in health care delivery system in india
    h) National health programme-background objectives, action plan, targets, operations, achievements and constraints in various national health programme.

Practicals

Hands on experience at peripheral centre

V Semester

Allied-5-Medical Ethics

General considerations of Medical Ethics

1. Medical Ethics - Introduction
2. Three cor contents in Medical Ethics - Best interest, autonomy unrights
3. Doctors, patient & Profession

Special considerations of Medical Ethics

1. Consent
2. Confidentiality
3. Genetics
4. Reproductive Medicine
5. Mental Health
6. End of life and organ transporentation
7. Research & clinical Trials

Reference Book

Medical Ethics & law, The cor curriculum
Author- Tony hope atla
Reference book no:- 16715 Center library

VI Semester

Core 16 - Optometric Optics & Dispensing Optics

UNIT I

Optometric Optics **12hrs**

1. Spectacle Lenses
2. Manufacture of glass
3. Lens materials
4. Lens surfacing
5. Principle of surface generation and glass cements
6. Terminology used in Lens workshop
7. Lens properties
8. Lens quality
9. Faults in lens material
10. Faults on lens surface

UNIT II

Optometric Optics **12hrs**

1. Methods of Inspecting the quality of lenses
2. Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)
3. Spectacle Frames
   Types and parts
   Classification of spectacle frames-material, weight, temple position,
4. Coloration
5. Frame construction
6. Frame selection
7. Size, shape, mounting and field of view of ophthalmic lenses

UNIT III

Optometric Optics **12hrs**

1. Tinted & Protective Lenses
2. Characteristics of tinted lenses Absorptive Glasses
3. Polarizing Filters, Photochromic & Reflecting filters
4. Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonatelenses
5. Multifocal Lenses:
   Introduction, history and development, types
6. Bifocal lenses, Trifocal & Progressive addition lenses
7. Reflection from spectacle lens surface & lens coatings
8. Reflection from spectacle lenses - ghost images -Reflections in bifocals at the dividing line

UNIT IV

Optometric Optics **12hrs**

1. Antireflection coating, Mirror coating, Hard Multi Coating [HMC],
2. Hydrophobic coating
3. Miscellaneous Spectacle:
4. Iseikonic lenses
5. Spectacle magnifiers
6. Recumbent prisms
7. Fresnel prism and lenses
8. Lenticular &Aspherical lenses
9. High Refractive index glasses

UNIT V -

Dispensing Optics **12hrs**

1. Components of spectacle prescription & interpretation, transposition, Add and nearpower relation
2. Frame selection -based on spectacle prescription, professional requirements, agegroup, and face shape
3. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height
4. Lens & Frame markings, pupillary centers, bifocal heights, Progressive markings &adjustments -facial wrap, pantoscopic tilt
5. Recording and ordering of lenses (power, add, diameter, base, material, type, lensenhancements)
6. Simple and toric transposition
7. Neutralization -Hand &lensometer, axis marking, prism marking
8. Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction)
9. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories Bands, chains, boxes, slevets, cleaner, screw driver kit
10. Spectacle repairs -tools, methods, soldering, riveting, frame adjustments
11. Special types of spectacle frames
    Monocles
    Ptosis crutches
    Industrial safety glasses
    Welding glasses
11. Frame availability in Indian market
12. FAQ's by customers and their ideal answers

Practicals

Visit To Manufacturing Units

1. Manufacturing Spectacle Lens
2. Manufacturing Bifocal Lenses
3. Measurement for Ordering Spectacle, Ipd, Marking Centration, V. D. Calculation.
4. Fitting Lenses in Frames
5. Fitting Bifocals, Multifocals, Prism Lenses
6. Glazing & Edging
7. Final Checking, Adjustments to Prescriptions
8. Patient Complaints, Handling Correction.
9. Repair of Spectacles
10. Special Types of Spectacles Monocells/Ptosis Hemianopic Glasses
11. Neutralization of Lenses
12. Focimeter
13. Shape of spectacle frame -measurements & making, frame & face measurements

Practical Examination: 40 marks

1. Identification and neutralization of various types of lenses and prisms - 10 marks
2. Measurement for Ordering Spectacle, IPD, Marking Centration, V. D. Calculation - 10 marks
3. Checking and Adjustments to Prescriptions, Patient Complaints, Handling - 10 marks
4. Repair of Spectacles - 10 marks

Recommended Books:

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

VI Semester

Core 17- Contact Lens, Practice Management & Occupational Optometry

UNIT I -

Contact Lens 1 **12hrs**

1. Fitting in astigmatism (sphrgp)
2. Correction of astigmatism with rgp lens
3. Types of fit - steep, flat, optimum - on spherical cornea with spherical lenses
4. Types of fit - steep, flat, optimum - on toric cornea with spherical lenses
5. Calculation and finalising contact lens parameters
6. Ordering rigid contact lenses - writing a prescription to the laboratory
7. Checking and verifying contact lenses from laboratory
8. Modifications possible with rigid lenses

UNIT II -

Contact Lens 2 **12hrs**

1. Common handling instruction
2. Insertion & removal techniques
3. Do's and dont's
4. Care and maintenance of rigid lenses
5. Cleaning agents & importance
6. Rinsing agents & importance
7. Disinfecting agents & importance
8. Lubricating & enzymatic cleaners

UNIT III -

Contact Lens 3 **12hrs**

1. Follow up visit examination
2. Follow-up slit lamp examination
3. Complications of rgp lenses
4. Fitting in keratoconus
5. Fitting in aphakia, pseudophakia
6. Cosmetic contact lenses
7. Fitting contact lens in children
8. Toric contact lenses
9. Bifocal contact lenses

UNIT IV -

Contact Lens 4 **12hrs**

1. Continuous wear and extended wear lenses
2. Therapeutic lenses/bandage lenses

3. Contact lens following ocular surgeries
4. Disposable contact lenses, frequent replacement and lenses
5. Use of specular microscopy and pachymetry in contact lenses
6. Instrumentation in contact lens practise
7. Checking finished lenses parameters
8. Recent developments in contact lenses
9. Review of lenses available in India

UNIT V

Occupational Optometry **12hrs**

1. Introduction to occupational health, hygiene and safety, international bodies like ILO, WHO, national bodies etc.
2. Acts and rules - factories act, wca, esi act.
3. Electromagnetic radiation and its effects on eye
4. Light - definitions and units, sources, advantages and disadvantages, standards
5. Color - definition, color theory, color coding, color defects, color vision tests
6. Occupational hazards and preventive/protective methods, task analysis
7. Industrial vision screening - modified clinical method and industrial vision test
8. Vision standards - railways, roadways, airlines
9. Visual display units
10. Contact lens and work

Practicals

1. Measurement of ocular dimensions
2. Pupillary diameter and lid characteristics
3. Blink rate and tbut
4. Schrimers test, slit lamp examination of tear layer
5. Keratometry
6. Placido's disc
7. Soft contact lens fitting - aspherical
8. Soft contact lens fitting - lathecut lenses
9. Soft contact lens over refraction
10. Lens insertion and removal
11. Lens handling and cleaning
12. Examination of old soft lens
13. Rgp lens fitting
14. Rgp lens fit assessment and fluorescein pattern
15. Special rgp fitting (aphakia, pseudo phakia& keratoconus)
16. Rgp over refraction and lens flexure
17. Examination of old rgp lens
18. Rgp lens parameters
19. Slit lamp examination of contact lens wearers

University practical examination-40 marks

1. Ocular measurements including keratometry - 20 marks
2. Fitting of contact lens and post fitting management - 20 marks

Reference Books:

a. Contact lens

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

b. Occupational Optometry

Recommended Books:

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

Recommended Books:

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

VI Semester

Core 18- Systemic Diseases & Management of OT

UNIT I

Systemic Diseases **12 hrs**

1. Hypertension -definition, classification, epidemiology, clinical examination, complications, and management of hypertensive retinopathy
2. Diabetes mellitus -classification, pathophysiology, clinical presentations, diagnosis, and management, complications, diabetic retinopathy
3. Thyroid disease -physiology, testing for thyroid disease, hyperthyroidism, hypothroidism, thyroiditis, thyroid tumors, grave's ophthalmopathy
4. Acquired heart disease, ischemic heart disease, congestive heart failure, disorders of cardiac rhythm -ophthalmic considerations
5. Cancer : incidence, etiology, therapy, ophthalmologic considerations

UNIT II

Systemic Diseases **12hrs**

1. Eye and connective tissue disease
2. Tuberculosis-aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye
3. Herpes virus (herpes simplex, varicella zoster, cytomegalovirus, epsteinbarr virus)
4. Hepatitis (hepatitis a, b, c)
5. Acquired immunodeficiency syndrome
6. Anemia (diagnosis, clinical evaluation, consequences, sickle cell disease, treatment, ophthalmologic considerations

UNIT III

Systemic Diseases **12hrs**

1. Common tropical medical ailments- malaria,typhoid,dengue,filariases,onchocerciasis,cysticercosis,leprosy
2. Nutritional and metabolic dijsorders: obesity, hyperlipidaemias, kwashiorkor, vitamin a deficiency, vitamin d deficiency, vitamin e deficiency, vitamin k deficiency, vitamin b1, b2, deficiency, vitamin c deficiency
3. Myasthenia gravis
4. First aid
5. General medical emergencies

UNIT IV-

Management of OT-I **12hrs**

1. Introduction to Ocular in general.

2. Asepsis: How to achieve
3. Anesthetic agents and where indicated
4. OT Sterilization procedures
5. Sterilization procedures of OT Instruments

UNIT V

Management of OT-II **12 hrs**

1. Maintenance of instruments and equipments: ophthalmic instruments
2. Maintenance of instruments and equipment's: orthoptics instruments
3. Maintenance of instruments and equipment's: surgical instruments
4. Maintenance of instruments and equipment's: optometric & contact lens equipment

Practicals

Case Demonstration

Practical Examination: 40 Marks

a. Spotters - 20 Marksb. Identification of OT instruments - 10 marks
c. Assessment of OT techniques - 10 marks

VI Semester
Elective 2- Practice Management

Course instructor:

Hospital administration department

1. Business management: Management concepts, Basic theories
2. Practice establishment and development: Feasibility study, marketing, entrepreneurship
3. Stock control and costing: Inventory management
4. Accounting principles
5. Sources of finance
6. Bookkeeping and cash flow
7. Taxation and taxation planning

VI Semester
Allied-6-Hospital Management

1. Quality Concepts: Definition of Quality, Dimensions of Quality, Basic concepts of Total Quality Management, Quality Awards. Accreditations for hospitals: Understanding the process of getting started on the road to accreditation, National and International Accreditation bodies, overview of standards- ISO (9000 & 14000 environmental standards), NABH, NABL, JCI, JACHO.

2. Hospital Information System: Hospital Information System Management and software applications in registration, billing, investigations, reporting, ward management and bed distribution, medical records management, materials management and inventory control, pharmacy management, dietary services, management, information processing. Security and ethical challenges.

3. Inventory Control: Concept, various costs of inventory, Inventory techniques-ABC, SDE / VED Analysis, EOQ models. Storage: Importance and functions of storage. Location and layout of stores. Management of receipts and issue of materials from stores, Warehousing costs, Stock verification.

4. Equipment Operations management: Hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, AMCS, outsourcing of maintenance services, quality and reliability, concept of failure, equipment history and documents, replacement policy, calibration tests, spare parts stocking techniques and polices

5. Biomedical Waste Management: Meaning, Categories of Biomedical Wastes, Colour code practices, Segregation, Treatment of biomedical waste-Incineration and its importance. Standards for waste autoclaving, microwaving. Packaging, Transportation & Disposal of biomedical wast