



JSS Academy of Higher Education & Research

(Deemed to be University)

Re-Accredited "A+" Grade by NAAC

Sri Shivarathreeswara Nagara Mysuru - 570015, Karnataka

Faculty of Biomedical Science

Regulation & Syllabus

B.Sc. OPTOMETRY
2023

BSc

REGULATIONS AND CURRICULUM

B.Sc. Optometry

2023



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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)]
- k. Bachelor of Science in Forensic Science [B.Sc. (FS)]
- l. Bachelor of Science (Honors) in Genetics & Genomics [B.Sc. (G & G)]
- m. Bachelors of Occupational therapy (BOT)

2. Eligibility for admission

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

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

OR

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

OR

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

OR

- 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

- 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 principal subject

OR

- 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

- 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.

- 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.

3. Duration of the course

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

4. Medium of instruction

The medium of instruction and examination shall be in English.

5. 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 and practical's/ clinicals separately) 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 in that semester. However, students will have to put up 75% attendance in the additional classes conducted by the department to appear for supplementary examination.

6. 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 IA examinations 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 IA examinations. Candidates have to secure 40% marks in the **IA theory and practical separately** in each subject to become eligible to appear for the University examination. The marks of the IA examinations must be displayed on the notice board of the respective departments within a fortnight from the date of IA examination. If a candidate is absent for any of the IA examinations due to genuine and satisfactory reasons, such a candidate may be given a re-examination, within a fortnight.

7. Subject and hours of teaching for theory and practical's

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	Tutorials hours		Credits	Practical hours	Credits	Total hours	Total credits
Core - 1	Anatomy	45	3	15	1		30	1	90	5
Core - 2	Physiology	45	3	15	1		30	1	90	5
Core - 3	Basic Biochemistry	45	3	15	1		30	1	90	5
Ability Enhancement -1	English	30	2	-	-		-	-	30	2
Ability Enhancement - 2	Kannada	30	2	-	-		-	-	30	2
Value added course 1	Yoga	15	1	-	-		15	-	30	1
Total Credits	20									

Table II: Distribution of teaching hours in Second Semester subjects

Category	Subjects	Theory hours	Credits	Tutorials hours	Credits	Practical hours	Credits	Total hours	Total credits
Core - 4	General Pathology	45	3	15	1	30	1	90	5
Core - 5	General Microbiology	45	3	15	1	30	1	90	5
Core - 6	Pharmacology	45	3	15	1	30	1	90	5
Value added course 2	Health care	30	2	-	-	-	-	30	2
Allied - 1	Psychology	30	2	-	-	-	-	30	2
Skill Enhancement-1	Soft skills	15	1	-	-	-	-	15	1
Total Credits	20								

Table III: Distribution of teaching hours in Third Semester subjects

Category	Subjects	Theory hours	Credits	Tutorials hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 7	Ocular Anatomy, Physiology and Biochemistry	45	3	15	1	90	3	150	7
Core - 8	Physical Optics	45	3	15	1	90	3	150	7
Core - 9	Refraction	45	3	15	1	90	3	150	7
Skill Enhancement-2	Computer application	30	2	-	-	-	-	30	2
Value added course-3	Environment Science and Health	30	2	-	-	-	-	30	2
Total Credits	25								

Table IV: Distribution of teaching hours in Fourth Semester subjects

Category	Subjects	Theory hours	Credits	Tutorials hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 10	Ocular Diseases 1	45	3	15	1	90	3	150	7
Core - 11	Ocular Diseases 2	45	3	15	1	90	3	150	7
Core - 12	Ophthalmic Instruments and Appliances	45	3	15	1	90	3	150	7
Skill Enhancement-3	Biostatistics and Research methodology	30	2	-	-	-	-	30	2
Value added course -4	Constitution of India	30	2	-	-	-	-	30	2
Total Credits	25								

Table V: Distribution of teaching hours in Fifth Semester subjects

Category	Subjects	Theory hours	Credits	Tutorials hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 13	Clinical & Advaced Refractions, Contact Lens	45	3	15	1	90	3	150	7
Core - 14	Clinical and Advanced Orthoptics	45	3	15	1	90	3	150	7
Core - 15	Community Ophthalmology, Low Vision Care and Eye bank	45	3	15	1	90	3	150	7
Elective 1		30	2	-	-	-	-	30	2
Allied - 2	Medical Ethics	30	2	-	-	-	-	30	2
Total Credits	25								

Table VI: Distribution of teaching hours in Sixth Semester subjects

Category	Subjects	Theory hours	Credits	Tutorials hours	Credits	Modality Posting + Practicals	Credits	Total hours	Total Credits
Core - 16	Optometric Optics & Dispensing Optics	45	3	15	1	90	3	150	7
Core - 17	Contact Lens, Practice Management & Occupational Optometry	45	3	15	1	90	3	150	7
Core - 18	Systemic Diseases & Management of OT	45	3	15	1	90	3	150	7
Elective-2		30	2	-	-	-	-	30	2
Allied-3	Hospital Management	30	2	-	-	-	-	30	2
Total Credits	25								

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
Accident Investigation	Forensic Medicine
Forensic Psychology	Forensic Medicine
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
DNA Typing	Forensic Medicine
Introduction to biometry	Forensic Medicine

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 *(compulsory 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 *(compulsory on payment basis for said courses)	Respiratory Care Technology, Emergence Medicine Technology, Anaesthesia and OT Technology, Cardiac Care Technology	VI	Emergency medicine

8. End Semester Examination

- 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.
- Non-University Examinations (NUE): Examination for Languages, Allied subjects, Skill enhancement, value added courses 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.
- The candidate must have passed all the previous subjects (Core/Language/Skill enhancement/Value based/Allied/Elective) from first to fifth semester to appear for the sixth semester University examination.

9. Scheme of Examination:

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	40	60	-	100	15	35	-	50
Core - 2	Physiology	40	60	-	100	15	35	-	50
Core - 3	Basic Biochemistry	40	60	-	100	15	35	-	50
Ability Enhancement -1	English		-	50	50	-	-	-	-
Ability Enhancement - 2	Kannada	-	-	50	50	-	-	-	-
Value added course 1	Yoga	-	-	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	General Pathology	40	60	-	100	15	35	-	50
Core - 5	General Microbiology	40	60	-	100	15	35	-	50
Core - 6	Pharmacology	40	60	-	100	15	35	-	50
Value added course 2	Health care	-	-	50	50	-	-	-	-
Allied - 1	Psychology	-	-	50	50	-	-	-	-
Skill Enhancement-1	Soft skills			50	50				

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

Category	Subjects	Theory				Practical			
Core - 7	Ocular Anatomy, Physiology and Biochemistry	IA	UE	NUE	Total	IA	UE	NUE	Total
		40	60	-	100	15	35	-	50
Core - 8	Physical Optics	40	60	-	100	15	35	-	50
Core - 9	Refraction	40	60	-	100	15	35	-	50
Skill Enhancement-2	Computer application	-	-	50	50	-	-	-	-
Value added course-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			
Core – 10	Ocular Diseases 1	IA	UE	NUE	Total	IA	UE	NUE	Total
		40	60	-	100	15	35	-	50
Core – 11	Ocular Diseases 2	40	60	-	100	15	35	-	50
Core – 12	Ophthalmic Instruments and Appliances	40	60	-	100	15	35	-	50
Skill Enhancement-3	Bio statistics and Research methodology	-	-	50	50	-	-	-	-
Value added course -4	Constitution of India	-	-	50	50	-	-	-	-

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

Category	Subjects	Theory				Practical			
Core - 13	Clinical & Advanced Refractions, Contact Lens	IA	UE	NUE	Total	IA	UE	NUE	Total
		40	60	-	100	15	35	-	50
Core - 14	Clinical And Advanced Orthoptics	40	60	-	100	15	35	-	50
Core - 15	Community Ophthalmology, Low Vision Care and Eye bank	40	60	-	100	15	35	-	50
Elective 1		-	-	50	50	-	-	-	-
Allied-5	Medical Ethics	-	-	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	40	60	-	100	15	35	-	50
Core - 17	Contact Lens, Practice Management Occupational Optometry	40	60	-	100	15	35	-	50
Core - 18	Systemic Diseases & Management of OT	40	60	-	100	15	35	-	50
Elective 2		-	-	50	50	-	-	-	-
Allied-6	Hospital Management	-	-	50	50	-	-	-	-

**Question paper pattern for end semester University theory examinations
(60 marks) Duration: Two hours**

- Short Essay : 04 questions out of 06 = 04x05=20
- Short Answer: 10 questions = 10x03=30
- Very Short Answer: 05 questions = 05x02=10
- Total = 60 Marks

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

MCQs 50 marks/Written theory assessment for 50 marks/Theory & practical assessment for 50 marks

10. Examiners

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 two internal/One Internal & one External examiners. Theory paper shall be valued by both the examiners.

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.

11. 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.

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

12. 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 C₁, C₂, C₃, C₄ and C₅ and the student's grade points in these courses are G₁, G₂, G₃, G₄ and G₅, respectively, and then students' SGPA is equal to:

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

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:

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

- c) Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VI semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VI 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:

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

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

13. 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

14. Carry over

A candidate who fails in core/language/skill enhancement/value based/allied/elective subjects of first semester to Fifth semester shall be permitted to carryover those subjects upto fifth semester. However, the candidate must have passed all the previous subjects (core/language/skill enhancement/value based/ allied/elective) to appear for the sixth semester University examination.

15. 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.

16. 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.

17. Award of degree

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

18. 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.

19. 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.

B.Sc. Optometry

Program outcomes

At the end the program the Optometry student should be able to

PO1: Demonstrate the comprehensive knowledge about complete refraction procedure of the eye.

PO2: Demonstrate the comprehensive knowledge and skills in evaluation of pathophysiology and pharmacology of eyeball diseases

PO3: Demonstrate comprehensive knowledge and skills in basic sciences about the whole body

PO4: Demonstrate the comprehensive knowledge and skills related to laboratory techniques in basic sciences

PO5: Demonstrate the comprehensive knowledge and skills related to common pathological and microbiological ailments.

PO6: Demonstrate the comprehensive knowledge and skills related to general pharmacology.

PO7: Evaluating the patient with proper history and documenting the same

PO8: Capability to demonstrate the skills in areas related to investigating procedures in ophthalmology.

PO9: Demonstrate the capability to apply analytical knowledge in prescribing the optics.

PO10: Communicate effectively with patients, peers and doctors

PO11: Life-long learner in equipping with higher technical skills and competencies

I Semester
Core-1 Anatomy

Course Outcome:

At the end of the course, students should know

CO1: Demonstrate the acquisition of comprehensive knowledge of basic tissues of the body.

CO2: Demonstrate the acquisition of comprehensive knowledge of gross anatomy of muscles, joints and organ system of human body

CO3: Demonstrate the acquisition of analysing the applied aspects concerned to human body.

CO4: Demonstrate the skill of identification of viscera of organ systems of human body

CO5: Demonstrate the skill of identification of microscopic structure of basic tissues and organs and correlate with their functions

CO6: Demonstrate the acquisition of comprehensive knowledge regarding the general embryology with congenital anomalies

Theory:

Unit I

03hrs

- Organization of the human body
- 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 membrane, cytoplasm, cell organelles
- **Cell division** – definition and main events in different stages of mitosis and meiosis
- Tissues – Tissues of the body
- Characteristics, functions and locations of different types of tissues
- Epithelial tissue – definition, classification with examples
- Glands – classification with examples
- Connective tissue and Nervous tissue

Unit II

Locomotion and Support

06hrs

- Locomotion and support
- Cartilage – structure, types with examples
- Skeletal system
- Classification, structure, functions and ossification
- Name, location and features of bones of the body.
- Joints – Definition, types of joints with examples
- Name, location, type, bones forming, movements possible in the synovial joints of the body.
- Muscular system
- Muscular tissue – skeletal muscle - gross anatomy and histology
- Cardiac and smooth muscle – histology

- Muscles of upper limb, lower limb, thorax, abdomen and head and neck

Unit III

Maintenance of the Human Body

12hrs

Cardio-vascular system

- Types and structure of blood vessels, capillaries
- Heart – location, coverings, external and internal features of heart, Blood supply of heart
- Systemic arteries and veins – major arteries and veins of the body

Lymphatic system

- Lymphoid organs – structure and functions

Respiratory system

- Organs of respiration, location, features of nasal cavity, pharynx, larynx, trachea, bronchi, lungs and pleura

Digestive system

- Organs of digestive system, location, features of oral cavity, Tongue, pharynx, oesophagus, stomach, intestine and accessory organs of digestion – salivary glands, liver and pancreas.

Unit IV

Excretory system and reproductive system

- Organs of urinary system, location and features of kidneys, ureter, urinary bladder and urethra
- Male and female reproductive organs. Location, features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory ducts, prostate gland, penis and spermatic cord
- Location and features of uterus, its supports, uterine tube, ovary and mammary gland

Embryology I - IV week

- gametogenesis, structure of sperm, growth of the ovarian follicles, events of 1st, 2nd and 3rd weeks of development, folding of embryo, derivatives of germ layers, placenta

Unit V

Control Systems of the Body

12hrs

1.Nervous system

- Introduction, coverings and blood supply of brain and spinal cord
- Spinal cord – location, external features and internal structure of spinal cord
- Brain – subdivisions, location, external features and internal structure of medulla oblongata, pons and midbrain, cerebellum and cerebrum.
- Thalamus and hypothalamus
- Basal ganglia
- Ventricles – location, formation and circulation of CSF
- Cranial nerves

2.Sense organs

- Location and features of olfaction, eye, ear and skin

3.Endocrine system

- Name of the endocrine glands, location and features, histology of pituitary gland, thyroid gland, parathyroid, suprarenal gland, pancreas, testis and ovary. Hormones secreted by each gland.

Practical :

30hrs

- Demonstration of parts of microscope and its uses
- Demonstration of skeleton and joint
- Demonstration of deltoid and gluteus maximus, Cubital fossa
- 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
- Demonstration of location and parts of lungs, histology of trachea and lungs
- Demonstration of location of stomach, small and large intestines. Location and features of pancreas, liver and gall bladder
- Demonstration of location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra
- Demonstration of location of male and female reproductive organs
- Demonstration of brain and spinal cord
- Histology of cornea and retina

Practical Examination: 35 Marks

1. Gross Anatomy- Discussion of any one specimen
2. Discussion of specimens of Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system
3. Spotters - Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system
4. Histology discussion of any one demonstrated slide

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

Course Outcome:

At the end of the course, students should know

CO1: Demonstrate the acquisition of comprehensive knowledge in the basic physiological concepts of general physiology.

CO2: Demonstrate the acquisition of comprehensive knowledge of circulation in human body.

CO3. Demonstrate the acquisition of comprehensive knowledge of all organ system of the body

CO4. Perform and analyse the investigation of blood.

Contents

Theory

Unit -I

General physiology and Blood

General Physiology

(2 Hrs)

- Homeostasis with body fluid compartments
- Cell membrane, types of transport across cell membrane
- Membrane potential-RMP & AP

Blood

(7 Hrs)

- Composition and function of blood:Haemopoiesis
- Haemoglobin : types & functions:RBC structure & function ,destruction. Anaemia & Jaundice
- WBC: types & functions. Immunity: definition & classification
- Platelets: structure & function. Haemostasis :steps in brief ,anticoagulant eg
- Blood groups: types, incompatibility, blood transfusion.
- Lymph: composition and functions

Unit -II

Digestive system & Respiratory system

Digestive System

(3Hrs)

- Organization and functions of digestive system
- Saliva: composition & functions
- Mastication and deglutition
- Functions of stomach
- Gastric juice: composition & functions
- Types of gastric motility
- Liver: functions, bile juices: composition & function, functions of gall bladder
- Pancreatic juice: composition & functions
- Small intestine: succus entericus, types of motilities
- Large intestine: functions

Respiratory system (4 Hrs)

- Functions of respiratory system. Mechanism of breathing {inspiration and expiration}
- Surfactant: composition and function. Lung volumes and capacities
- Pulmonary ventilation, alveolar ventilation, dead space
- Transport of oxygen and carbon di oxide {only difference}
- Hypoxia: definition, types, dyspnea, apnea, hyperventilation

Unit -III**Cardiovascular and Endocrine system****Cardiovascular system (4Hrs)**

- List the properties of cardiac muscle
- Origin spread of cardiac impulse
- ECG: Definition, normal ECG, diagram in lead II
- Cardiac cycle: definition, normal duration, phases
- Heart sounds types, normal characteristics
- Blood pressure: Definition, components, normal values, factors affecting it
- Name different regional circulation, effect of exercise on CVS (brief)

Endocrine System (7 Hrs)

Name the different endocrine glands, hormones secreted by them

HORMONE: Structure, Function, name the disorders involved with that hormone {hypo and hyper secretion}

Unit -IV**Excretory system and Reproductive system****Excretory System (4Hrs)**

- Types of nephrons and its differences, JG Apparatus
- GFR: definition , normal values , factors affecting
- Tubular functions: absorption and secretion in different segment
- Micturition process
- Skin and body temperature

Reproductive system (3Hrs)

- Puberty in male and female
- Spermatogenesis, semen composition& analysis
- Functions of Testosterone
- Functions of Estrogen
- Functions of Progesterone.
- Menstrual cycle: uterine and ovarian cycle (brief only)
- Contraception both in men and women: types

Unit -V**Muscle nerve physiology, Nervous system and Special senses****Muscle nerve physiology (2Hrs)**

- Classification of neurons and nerve fiber. List of properties of nerve fibers

- Neuroglia: types
- Types of muscle, steps of neuromuscular transmission ,E-C coupling ,muscle contraction

Nervous system

(5Hrs)

- Synapse: types, list properties, list functions
- Receptor: structure, type, sensation carried by it , list the properties
- Reflex: reflex arc, classification, functions
- Ascending tract: list them and its function
- Descending tract: list them and its function
- Cerebral cortex: different lobes and its functions
- functions of basal ganglia, thalamus, hypothalamus
- functions of cerebellum
- CSF: composition and function

Special senses

(4Hrs)

- Olfaction: tract, types of smell, odorant, receptor, name the applied aspect
- Gustation: pathway, types of tastes, taste buds, name the applied aspect
- Vision: rods, cones, differences, dark & light adaptation, visual pathway & name the applied aspect, errors of refraction & its correction, colour blindness, cataract
- Audition: functions of external ear, middle ear & inner ear, content of middle ear & inner ear, Organ of Corti, hearing pathway, name the applied aspect

Practicals

(30 Hrs)

- Haemoglobinometry.
- Haemocytometry
- Total leucocyte count.
- Total Red blood cell count.
- Determination of blood groups.
- Differential WBC count.
- Determination of clotting time, bleeding time.
- Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume, Calculation of Blood indices: CI, MCH, MCV, MCHC.
- Blood pressure recording.
- Spirometry, Artificial Respiration

Practical Examination : 35 Marks

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

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, 3rd 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, 8th Ed. AryaPubliction.
2. Guyton (Arthur) Text Book of Physiology. 13ed Ed. Prism Publishers.
3. Ganong (William F) Review of Medical Physiology. 27th Ed. Appleton.

I Semester
Core- 3- Basic Biochemistry

Course outcome:

At the end of the course, students should know

CO1: Demonstrate acquisition of comprehensive knowledge of cellular structure with its functions

CO 2: Demonstrate acquisition of comprehensive knowledge and skills related to Biomedical importance of macromolecules and micromolecules.

CO 3: Demonstrate acquisition of comprehensive knowledge of the enzymes

CO 4: Demonstrate acquisition of comprehensive knowledge and skills related to biochemical components of blood, urine and body fluids.

CO 5: Demonstrate acquisition of comprehensive knowledge of biochemical importance of nutrition

CO 6: Demonstrate acquisition of comprehensive knowledge of quality control and biomedical waste management in medical laboratory.

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. Definition & Classification of Proteins based composition, conformation, and function. Functions Plasma proteins, Biologically important peptides and their functions, and Immunoglobulins -structure and functions
- Lipids- Definition, Classification, Biological importance, and Functions of Lipids. Structure and functions of Cholesterol, types and functions of Lipoproteins. Fatty acids -definition and Classification
- Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides and their functions.

Unit II **06 hrs**

Enzymes & Acid base balance

- Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition – types and their importance.
- Acids, Bases & Body Buffers -Definition with examples, and regulation of pH in brief.

Unit III **12hrs**

Vitamins & Minerals

- Vitamins-Classification, Sources, RDA, Functions (in brief), deficiency manifestations and hypervitaminosis of fat-soluble vitamins A, D, E and K.
- Sources, RDA, Functions (in brief), deficiency manifestations of water-soluble vitamins – Thiamine. Riboflavin, Niacin, Pyridoxine, Biotin, Pantothenic acid, Folic acid, cobalamin and Ascorbic acid.
- Minerals-Classification.
- Calcium, Phosphorus, Iron, copper, Iodine, zinc, calcium, phosphorous, sodium, potassium

& chloride -Sources, RDA, Functions (in Brief), deficiency manifestations.

Unit IV

05hrs

Nutrition, Blood chemistry & Urine Chemistry

- Nutrition- Nutrients, Calorific value of food, BMR and factors affecting BMR, respiratory quotient and its applications, biological value of proteins, nitrogen balance, Protein energy malnutrition.
- Blood chemistry- Biochemical components & their reference ranges in normal & diseased states- glucose, urea, creatinine, electrolytes, total proteins and albumin.

Unit V

10hrs

Clinical Biochemistry-

- 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

30hrs

- General Reactions of Carbohydrates.
- Identification of carbohydrates
- Color reactions of Proteins.
- Reactions of Non-Protein nitrogenous substances.
- Demonstration of pH meter, Colorimeter, and spectrophotometer.
- Demonstration of Chromatography and Electrophoresis.

Practical Examination: 35Marks

1. Identification carbohydrates or NPN substances - 10 Marks
2. Color reactions of Proteins - 15 Marks
3. Spotters - 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
 - Find the section of the dictionary with first letter of your word.
 - Read the guide words.
 - Scan down the page for your word.
 - 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

- Noun
- Pronoun
- Adjective
- Verb
- Adverb
- Preposition
- Conjunction
- 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.

3. Paragraph Structure

4. A paragraph consists of 3 main structures :

- Claim
- Evidence
- Analysis

Enlargements of Vocabulary Roots: H to M

Unit III

Written Composition

a) Precise writing and Summarizing

- 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.

- 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

1. What is a bibliography?

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

2. 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.

3. Why you must do a bibliography?

- c) To acknowledge and give credit to sources of words, ideas, diagrams, illustrations and quotations borrowed, or any materials summarized or paraphrased.
- d) To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.

4. What must be included in a bibliography?

- Author
- Title
- Place of publication
- Publisher
- Date of publication
- Page number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopedias, or in anthologies)

5. Writing a bibliography in MLA style

- 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.

- 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).

a) Enlargement of Vocabulary Roots - N to S

Unit IV

Reading and Comprehension

- Review of selected materials and express oneself in one's words Seminar for students on powerpoint presentation and book review.
- Enlargement of Vocabulary Roots - T to Z

Unit V

The study of Various 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

- Letter

Mechanics of writing formal and business letters. Exercises on writing letters for students.

- Summary

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

- Practice In Writing

Exercises and assignments on report writing for students

Unit VI

Verbal Communication

- Discussions And Summarization Tips on taking minutes of a meetingWhy 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 idea
3. 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.

4. 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

b. 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.

c. Use in Teaching Writing of dialogues

Originating from dialogues, 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

- Quotation Marks
- Periods
- Question Marks
- Commas
- Capitalization and Paragraphs
- 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
- On the street (with a vegetable vendor)
 - At college with a lecturer (regarding admissions)
 - In a bank with the manager (for opening a bank account)
 - Telephone conversation with a hotel receptionist (make room reservations)
 - Telephone conversation (taking an appointment with the dentist/doctor)

**I Semester
Language 2- Kannada**

ಕನ್ನಡ : ಒಂದು

ಪಠ್ಯಕ್ರಮದ ರೂಪರೇಖೆ

ಸ್ಥಾನ
ಸಮಯ
ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ

- : ಬಿ.ಎಸ್.ಸಿ. (ಅಲ್ಟಿಮ್ ಹೆಲ್ತ್ ಸೈನ್ಸ್ ಕೋರ್ಸ್) ಮೊದಲವರ್ಷ
- : 30 ಘಂಟೆಗಳು (ಮೂವತ್ತು ಘಂಟೆಗಳು)
- : ವಿದ್ಯಾರ್ಥಿ/ ವಿದ್ಯಾರ್ಥಿನಿಯರು ದಿನನಿತ್ಯ ಸಂಪರ್ಕಿಸಬಹುದಾದ ಜನಸಾಮಾನ್ಯರೊಡನೆ ಶುಶ್ರೂಷೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಕನ್ನಡದಲ್ಲಿ ಸಂಭಾಷಣೆ ಮಾಡಲು ಹಾಗೂ ತಿಳುವಳಿಕೆ ನೀಡಲು ಸಹಕಾರವಾಗುವಂತೆ ಪಠ್ಯಕ್ರಮದ ಮಾದರಿಯನ್ನು ಅಳವಡಿಸುವುದು.
- : ದಿನಬಳಕೆಯ ವ್ಯವಹಾರದಲ್ಲಿ ಶುಶ್ರೂಷಣೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಕನ್ನಡ ಭಾಷೆಗೆ ಅಳವಡಿಕೆ.
- : ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಭಾಷೆಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಉದ್ದೇಶ

ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ

ಘಟಕಒಂದು (ಆರು ಘಂಟೆಗಳು)

ಚಟುವಟಿಕೆ

ಘಟಕಎರಡು (ಆರು ಘಂಟೆಗಳು)

ಚಟುವಟಿಕೆ

ಘಟಕಮೂರು (ಆರು ಘಂಟೆಗಳು)

ಚಟುವಟಿಕೆ

ಘಟಕ ನಾಲ್ಕು (ಆರು ಘಂಟೆಗಳು)

ಚಟುವಟಿಕೆ

ಘಟಕ ಐದು (ಆರು ಘಂಟೆಗಳು)

- : ಅಕ್ಷರಮಾಲೆ, ಸ್ವರಗಳು, ವ್ಯಂಜನಗಳು, ಕಾಗುಣಿತ, ಬರವಣಿಗೆ, ಅಭ್ಯಾಸ.
- : 1. ಕನ್ನಡ ವರ್ಣಮಾಲೆಯ ಅಕ್ಷರಗಳನ್ನು ಬರೆಯಿರಿ.
- : ಪದಪರಿಚಯ, ಪದಪುಂಜ, ದಿನಬಳಕೆಯ ಪದಗಳು, ಸಂಬಂಧಗಳು, ನಾಮಪದ, ಸರ್ವನಾಮ, ಅಂಕಿಗಳ ಪರಿಚಯ, ಪ್ರಶ್ನಾರ್ಥಕ ಪದಗಳು.
- : 1. ನಿಮಗೆ ತಿಳಿದಿರುವ ವಿವಿಧ ರೋಗಗಳ ಹೆಸರುಗಳನ್ನು ಪಟ್ಟಿಮಾಡಿ.
- : 2. ನಿಮಗೆ ತಿಳಿದಿರುವ ತಿಂಡಿ - ತಿನಿಸುಗಳ ಹೆಸರುಗಳನ್ನು ಪಟ್ಟಿಮಾಡಿ.
- : ಲಿಂಗ, ವಚನ, ಅವ್ಯಯ, ತಿಂಡಿ - ತಿನಿಸುಗಳ ಪರಿಚಯ, ದೇಹದ ಅಂಗಗಳ ಪರಿಚಯ, ವಿವಿಧ ಬಗೆಯ ರೋಗಗಳ ಪರಿಚಯ.
- : ರೋಗಿಯ ವಿವರ ತಿಳಿಯಲು ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ಬಳಸಲಾಗುವ ನಮೂನೆಯ ಮಾದರಿಯನ್ನು ರಚಿಸಿ.
- : ಶುಶ್ರೂಷಣಾ ಪದಗಳು, ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ಬಳಸುವ ವಿವಿಧ ನಮೂನೆಗಳ ಪರಿಚಯ, ನಮೂನೆಗಳ ರಚನೆ.
- : ಶುಶ್ರೂಕರು ಮತ್ತು ರೋಗಿಯ ನಡುವಿನ ಸಂಭಾಷಣೆಯ ಮಾದರಿಯನ್ನು ತಯಾರಿಸಿ.
- : ಶುಶ್ರೂಕರ ಹಾಗೂ ರೋಗಿಗಳ ನಡುವೆ ನಡೆಯುವ ಸಂಭಾಷಣೆಗೆ ಬೇಕಾದ ವಾಕ್ಯಗಳ ಪರಿಚಯ.

ಅಧ್ಯಯನಕ್ಕೆ ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿರುವ ಗ್ರಂಥಗಳು

1. ಕನ್ನಡ ವ್ಯಾಕರಣ (8,9 ಮತ್ತು 10ನೇ ತರಗತಿಗಳಿಗೆ ಕರ್ನಾಟಕ ಸರ್ಕಾರ, ಪಠ್ಯಪುಸ್ತಕಗಳ ಇಲಾಖೆ)
2. ವ್ಯವಹಾರಿಕಕನ್ನಡ : ಎಚ್ಚಿಕ್ಕಿ
3. ಪತ್ರಲೇಖನ : ಕನ್ನಡಸಾಹಿತ್ಯಪರಿಷತ್ತು
4. ಲೇಖನಕಲೆ : ಎನ್ ಪ್ರಹ್ಲಾದರಾವ್
5. ಆರೋಗ್ಯ ಮತ್ತು ಇತರೆ ಪ್ರಬಂಧಗಳು : ಡಾ|| ಪಿ.ಎಸ್ ಶಂಕರ್
6. ವೈದ್ಯ ಪದಗಳ ಹುಟ್ಟುರಚನೆ : ಡಾ|| ಡಿ.ಎಸ್.ಶಿವಪ್ಪ

ಕನ್ನಡ: ಎರಡು

ಪಠ್ಯಕ್ರಮದರೂಪರೇಖೆ

ಸ್ಥಾನ

ಸಮಯ

ಉದ್ದೇಶ

- : ಬಿ.ಎಸ್.ಸಿ.(ಅಲ್ಟಿಮ್ ಹೆಲ್ತ್ ಸೈನ್ಸ್ ಕೋರ್ಸ್) ಮೊದಲ ವರ್ಷ
- : 30 ಘಂಟೆಗಳು (ಮೂವತ್ತು ಘಂಟೆಗಳು)
- : ಜನರ ಆರೋಗ್ಯದ ಬಗ್ಗೆ ಸಮುದಾಯಕ್ಕೆ ತಿಳುವಳಿಕೆ ಕೊಡುವುದು.

Value Added Course
Yoga

Learning Objectives

- To define Yoga and understand the history of yoga
- To understand general concept and practice of yoga.

Syllabus

Yoga theory- 15 hours

Unit I: History & Origin of Yoga:

(2 hours)

- Introduction to Yoga
- Introduction to Yoga education & its importance.
- Evolution of Yoga- Concept about yoga origin, Pre-vedic & Vedic period
- Modern view about yoga.

Unit: II General Perspective of Yoga

(3 hours)

- Definitions of Yoga, Objectives of Yoga, Importance of yoga and Misconceptions about Yoga,
- Principles of Yoga,
- Brief Introduction of schools of Yoga.
- Yogic Lifestyle.

Unit: III Introduction to Yoga practises:

(10 hours)

- Standing & Sitting Series of Asanas
- Supine & Prone Series of Asanas.
- Relaxation technique & its importance.
- Pranayama & its importance

REFERENCE:

1. Lal Basant Kumar: Contemporary Indian Philosophy, Motilal Banarsidas Publishers Pvt. Ltd, Delhi, 2013
2. Dasgupta S. N: History of Indian Philosophy, Motilal Banarsidas, Delhi, 2012
3. Singh S. P: History of Yoga, PHISPC, Centre for Studies in Civilization Ist, 2010
4. Singh S. P & Yogi Mukesh: Foundation of Yoga, Standard Publication, New Delhi, 2010
5. G.C Pande, Histroy of science, philosophy, and culture of Indian Civilization Vol.VII part 10 Centre for Studies in Civilisations.
6. Asana, Pranayama, Bandha, Mudra by Swami Satyananda Saraswati Bihar School of Yoga.

Yoga practical- 15 hours

All Yogic sessions will be started with brief theory of technique of yogic practices, name of the practice, precautionary measures to be taken before, during and after practice of yoga & its benefits. This will enhance the students to learn different techniques of yoga.

Unit I: Breathing Practices & Sukshma Vyayama (Loosening exercise)

- Hands stretch breathing , Hand In & out breathing.
- Sukshma Vyayama: *All Joints Rotation*: Fingers, Wrist, Elbows, Shoulder rotation, Neck Flexion/ Extension, Neck rotation, knee movements & ankle joint movements
- Hip rotation, extension and all possible movements.
- Stretching: Forward, Backward & Sideward bending & Situps.

Unit II: Asanas, Pranayama & Relaxation technique.

- Suryanamaskara (12 Series of asana)
- **Standing Series:** Ardha Chakrāsana , Ardhakati Chakrāsana, Trikonasana, Vrikshasana, Tadasana;
- **Sitting Series:** Vajrāsana, paschimotāsana Ustrasana, Vagrāsana,; **Prone Series:** Bhujangasana, Shalabasana ;**Supine series:** Uttitapadasana & setubhandasana,
- **Pranayama & Relaxation technique:** Suryabedana, Chandrabedana, Anuloma Viloma; Relaxation technique- Quick relaxation technique.

Reference:

1. Asana by Swami Kuvalyananda Kaivalyadhama, Lonavla.
2. Asana, Pranayama, Bandha, Mudra by Swami Satyananda Saraswati Bihar School of Yoga.
3. Light on Yoga, by B.K.S Iyengar, Harper Collins Publishers.
4. Surya Namaskar by Saraswati, Swami Satyananda, Bihar School of Yoga.

II Semester
Core 4-General Pathology

Course outcome:

At the end of the course student should be able to

CO1: Demonstrate the acquisition of comprehensive knowledge of cell pathology and repair

CO2: Demonstrate the acquisition of comprehensive knowledge of pathogenesis, morphology and complications of hematological diseases of the body.

CO3: Perform and analyse basic hematology techniques.

CO4: Acquisition of Knowledge of workflow and to perform basic investigations in Transfusion medicine and clinical pathology.

CO5: Demonstrate the acquisition of comprehensive knowledge of handling, storage and quality assurance of cytology lab.

Unit I

10 hrs

General pathology-Introduction- & scope of pathology

1. Cell injury and Cellular adaptations- Normal cell, Cell injury- types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations- atrophy, hypertrophy, hyperplasia, metaplasia.
2. Inflammation-Introduction, acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation- general features, granulomatous inflammation, tuberculosis.
3. Healing and repair- Definition, different phases of healing, factors influencing wound healing, fracture healing.
4. Haemodynamic disorders- Edema, hyperemia, congestion, hemorrhage, embolism, thrombosis, infarction.
5. Neoplasia- definition, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions.
6. Environmental and nutritional pathology-smoking, obesity and vitamin deficiencies.

Unit- II

10 hrs

Hematological Disorders

5 hrs.

1. Introduction and hematopoiesis
2. Anemia-introduction and classification (morphological and etiological).
3. Iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency, lab findings, megaloblastic anemia: causes, lab findings.
4. Hemolytic anemias: definition. Causes, classification, and lab findings.
5. WBC disorders- quantitative disorders, leukemia-introduction, Pancytopenia.
6. Bleeding disorders- Introduction, Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings.

Basic Hematological Techniques

5 hrs

1. Characteristics of good technician, Blood collection- methods (capillary blood, venipuncture, arterial puncture) complications, patient after care.
2. Anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions.
3. Complete hemogram- CBC, peripheral smear, BT, CT, PT, APTT, ESR, PCV
4. Automation in hematology-principles of autoanalyzer -3 part, 5 part and six part analysers

- and coagulometer-interpretation of autoanalyzer results.
5. Disposal of the waste in the laboratory.

Unit- III

5 hrs

Transfusion Medicine

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

Clinical Pathology

1. Examination of cerebrospinal fluid-physical examination, chemical examination, microscopic examination.
2. Examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination.
3. Sputum examination.

Unit- IV

10 hrs

1. Blood collection- methods (capillary blood, venipuncture, arterial puncture) complications, patient after care.
2. Handling and storage of samples in hematology
3. Interpretation of autoanalyzer results- complete blood count and erythrocyte Indices- MCV, MCH, MCHC.
4. Reticulocyte staining and counting.
5. Staining of peripheral smear and Differential leucocyte count
6. Quality assurance in hematology.
7. Introduction and basics of histopathology –Handling, storage, and processing of specimens.

Unit- V

10 hrs

1. Introduction to clinical pathology and Urinalysis- collection. Preservatives, physical, chemical examination and microscopy
2. Physical examination; volume, color, odor, appearance, specific gravity and pH,
3. Chemical examination; strip method- protein- heat and acetic acid test, sulfosalicylic acid method, reducing sugar- benedicts test, ketone bodies- rothas test, bile pigments- fouchet method, bile salt- hays method, blood- benzidine test, urobilinogen and porphobilinogen- ehrlich aldehyde and schwartz test, bence jones protein, microscopy.
4. Handling and storage of samples in cytology and clinical pathology.
5. Quality assurance in cytology and clinical pathology

Practicals:

30 hrs

1. Laboratory organization- Reception of specimen, dispatch of reports, records keeping. Laboratory safety guidelines.
2. SI units and conventional units in hospital laboratory.
3. Basic requirements for hematology laboratory, glasswares for hematology, pipettes and equipments for haematology lab and anticoagulant vials.
4. Blood collection- methods (capillary blood, venipuncture, arterial puncture) complications, patient after care.
5. Determination of haemoglobin.
6. Determination of ESR and PCV.
7. RBC count and TLC by hemocytometer.
8. Differential leukocyte count and Absolute eosinophil count
9. Interpretation of autoanalyser results- complete blood count and erythrocyte Indices- MCV, MCH, MCHC.

10. Reticulocyte staining and count.
11. Introduction to clinical pathology and Urinalysis- collection. Preservatives, physical, chemical examination and microscopy- semiautomated and automated methods 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- Rothera's test, bile pigments- fouchet method, bile salt- hays method, blood- benzidine test, urobilinogen and porphobilinogen- Ehrlich aldehyde and Schwartz test, Bence jones protein, microscopy.
12. Charts.

Practical Examination- 35 marks.

1. Spotters
2. Hemoglobin estimation and blood grouping
3. Charts
4. Urinalysis

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. Chakraborty, Gargi Chakarborty New Central bookagency, 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- General Microbiology
Theory

Course outcome:

At the end of the course student should be able to

CO1: Demonstrate the acquisition of knowledge of morphology of bacteria, viruses, parasites and fungal pathogens causing human infections

CO2: Demonstrate capability to practice appropriate staining technique, sterilization and disinfection techniques used in microbiology

CO3: Demonstrate the acquisition of knowledge of immunity, immunization schedule and role of Immunoprophylaxis.

CO4: Demonstrate the acquisition of knowledge about infection control and practices in laboratory.

CO5: Demonstrate capability to explain the concepts and principles of compound microscope and its applications

Unit - I

09 hours

General Microbiology

- Introduction to Medical microbiology and Classification of microorganisms
- Morphology and Physiology of bacteria
- Sterilization and Disinfection practices followed in a tertiary care centre including CSSD and recent advances.
- Culture methods
- Infection
- Specimen collection and laboratory diagnosis of infectious diseases

Immunology

- Antigen
- Antibodies
- Immunity
- Vaccines and immunization schedule, Immunoprophylaxis

Unit – II

09 hours

Systemic bacteriology

- Staphylococcus, Streptococcus pyogenes and Pneumococcus
- Overview of Clostridia and C. tetani
- M. tuberculosis
- Enterobacteriaceae - Klebsiella, E. coli, Proteus
- Non-fermenters - Pseudomonas and Acinetobacter

Unit – III

09 hours

Parasitology

- Introduction to parasitology and lab diagnosis of parasitic infections
- Protozoa - *Entamoeba histolytica*, Giardia, trichomonas, Malaria, Hook worm and Round worm

Unit – IV

09 hours

Mycology

- Introduction to mycology and lab diagnosis of fungal infections
- Yeasts - Candida and Cryptococcus
- Moulds – Aspergillus, Zygomycetes

Virology

- General properties of viruses and laboratory diagnosis of viral infections
- Blood borne viral infections - Hepatitis B and C viruses, HIV

Unit – V

09 hours

Applied microbiology

- Hospital acquired infections - Causative agents, transmission methods, investigation, prevention and control of hospital Acquired infections.
- SSI, VAP, CAUTI, CLABSI
- Overview of opportunistic infections – Definition, predisposing factors and etiological agents
- Standard and universal precautions
- Biomedical waste management

Practicals

30 hours

1. Compound microscope and demonstration of the parts.
2. Demonstration of sterilization equipment's - hot air oven, autoclave- principle, mechanism of action, preparation of the materials and quality control
3. Disinfection practices in a tertiary care centre - Disinfection of OT, Wards, OPD, dialysis units and laboratories
4. Testing of water, air and environmental surveillance
5. Demonstration of commonly used culture media with and without growth- Nutrient agar, blood agar, chocolate agar, Mac Conkey medium, Lowenstein-Jensen media, AST plate and Robertson cooked meat broth
6. Classification of Stains and Procedure and interpretation of Grams staining

Practical examination : 35 marks

Spotters, Culture media, Equipments, Slides

Discussion:

1. Gram stain
2. Ziehl- Neelsen stain

Reference Books

1. Ananthanarayan & Panikar's Textbook of Microbiology – Latest Edition University Press.
2. Parasitology (protozoology and helminthology Parasitology) by K D Chatterjee
3. Text book of Practical Microbiology for MLT by C P Baveja, Arya publications
4. Text book for laboratory technicians by Ramnik Sood. Jaypee publishers
5. Textbook of parasitology by Paniker. 7th edition

**II Semester
Core - 6 - Pharmacology**

Course outcome:

At the end of the course student should be able to

CO1: Demonstrate the acquisition of comprehensive knowledge of basics of pharmacology

CO2: Demonstrate the acquisition of comprehensive knowledge about the pharmacokinetics and pharmacodynamics of drugs

CO3: Demonstrate the capability of enlisting the drugs used on various organ system of the body including hormones and chemotherapy

CO4: Demonstrate the capability of enlisting the drugs used on emergency conditions

CO5: Demonstrate the capability of enlisting the uses of various devices and instruments used in hospital setting.

CO6: Demonstrate the skills of identifying the devices, instruments, drugs and dosage forms

Content

UNIT I- General Pharmacology, ANS, PNS.

9 Hrs

- Sources of Drugs
- Route of drug administration
- Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion)
- Pharmacodynamics (Mechanisms of action)
- Adverse drug reactions
- ANS : Adrenergic drugs -Adrenaline,
- Anti adrenergic-alpha and beta blockers
- Cholinergic drugs-Acetyl choline
- Anti cholinergic agents-Atropine

Unit II- PNS, CVS, Renal system

9 hrs

- Skeletal muscle relaxants-
- Local anaesthetics-lignocaine, LA + vasoconstrictor
- CVS-ionotropic agents -Digoxin,
- Antianginal drugs-GTN,
- Antihypertensives-
- Management of different types of shock and Plasma expanders
- Renal system-Diuretics Antidiuretics-Vasopressin

Unit III- CNS, Blood

9 hrs

- CNS-general Anaesthetics
- Sedative hypnotics-
- Antiepileptics
- Opioid analgesics-
- NSAIDS-
- Respiratory system-treatment of cough And Bronchial asthma
- Blood-Hematinics, Anticoagulants -Warfarin, Heparin
- Thrombolytics & Antiplatelet drugs-streptokinase,/ aspirin,

Unit IV- GIT,Chemotherapy**9 hrs**

- GIT-drugs used in peptic ulcer-
- Antiemetics -Metaclopramide, Domperidone, Ondansetron
- Purgatives & Laxatives
- Drugs used in Diarrhoea- ORS, Super ORS, Antimotility drugs (loperamide, diphenoxylate)
- Chemotherapy-general considerations MOA, Resistance, Prophylaxis

Unit V- Chemotherapy, Hormones**9 hrs**

- Anti-bacterial, anti-fungal, anti-viral, anti-protozoal, anti-helminthic
- Cancer chemotherapy (names, common Adverse effects, general principles in the treatment of cancer)
- Hormones-Thyroid and antithyroid drugs, Insulin, glucagon, antidiabetic drugs, corticosteroids, oestrogen, progesterone, oxytocin

Practicals**30 hrs**

- Dosage forms
- Solid Dosage forms
- Liquid Dosage forms
- Gaseous Dosage forms
- Oral route
- Parenteral routes
- Novel routes
- Fixed dose combination- Amoxycillin+ clavulanic acid-cotrimoxazole, Lignocaine+ Adrenaline
- Drug stations-Adrenaline, dopamine, Dobutamine)
- Drug stations-Corticosteroids (hydrocortisone, prednisolone, inhalational steroids) Drug stations-common antibiotics (Amoxycillin, Ciprofloxacin, Azithromycin, Metronidazole, Cephalosporins)
- Drug stations-Insulin preparations
- Instrument & devices (Nasogastric tube, laryngoscope, Different Catheters, Nebulizers, Inhalers, Rota halers)

Practical examination: 35 marks

1. Dosage Form: 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: Inhalers, Rota halers, Space halers, Drip sets, Vasofix, Ryle's tube, Urinary catheter, Endotracheal tube, Hand gloves
3. 10 Spotters

Recommended Books

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 understand concept of disease and its causation.
3. To know the health care delivery system in India
4. To understand epidemiology of common infectious diseases of India.
5. To know various National Health programmes of India
6. To have overview of First Aid and Bio-Medical Waste management principles and guidelines

Content:

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;

1c. Determinants of Health

- The factors which determine human health like social, economic, cultural, nutritional factors, etc. will be discussed. Common health problems in India - Communicable diseases, Non communicable diseases, MCH problems, Nutritional problems, Environmental sanitation, Glance over National Health profile.

Unit II

2a. Concept of disease and causation.

- Germ theory of disease, Epidemiological triad, Natural History of disease, concept of prevention. Definition of Epidemiology.

2b. Epidemiology of common infectious diseases

- Brief epidemiology of Tuberculosis, Malaria, Dengue, HIV, Leprosy

Unit III

3a. Evolution of health care delivery systems

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

3b. 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 IV

4a. 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.
- Primary Health care- current status in India- Status of health care infrastructure; Health team concept.

4b. Secondary and tertiary health care: Delivery of services

- Community Health centre; First referral unit; District hospital.

Unit V

5a. National Health Programmes- Communicable diseases

- Introduction; National Vector Borne Disease Control Programme; National Leprosy Eradication Programme; National Tuberculosis Elimination
- Programme; National AIDS Control Programme; Universal Immunization Programme; National Rural Health Mission.

5b. National Health Programmes- Non-communicable diseases

- National Programme for Control of Blindness; National Programme for control of Diabetes, Cardiovascular diseases, Cancer and Stroke (NPCDCS); National Mental Health Programme. Nutritional programmes.

5c. National Health Programmes – Maternal and Child Health

- Reproductive and Child Health Programme; Integrated Management of Neonatal and Childhood Illnesses; National Nutritional Anemia Prophylaxis Programme

UNIT VI

6a. 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

6b. Biomedical Waste (BMW) Management

- Sources of Bio-medical waste, principles of bio-medical waste management, step in management of BMW.

Recommended Books Recent Editions.

1. Park K. Park's Textbook of Preventive and Social Medicine. 26th ed. Jabalpur: Banarsidas Bhanot Publishers, 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 6th 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

DESCRIPTION: This course is designed to enable the students to develop understanding about basic concepts of psychology and its application in personal and professional life. It further provides students opportunity to recognize the significance and application of counselling skills.

Objectives: On completion of the course, the students will be able to

1. Identify the importance of psychology in individual and professional life.
2. Understand biological basis of human behaviour
3. Understand mental health and hygiene
4. Understand personality and gain experience in personality assessment
5. Understand stress and learn coping strategies
6. Learn suicide prevention and counselling skills

Unit -I

- Meaning of Psychology
- Scope of Psychology- Scope, branches and methods of psychology
- Relationship with other subjects
- Applied psychology to solve everyday issues

Unit -II

- **Personality** Introduction: Meaning, definition, Classification, measurement and evaluation of personality

Unit -III

Biological basis of behavior –Introduction

- Body mind relationship
- Genetics and behaviour
- Inheritance of behaviour
- Brain and behaviour.
- Psychology and sensation – sensory process normal and abnormal.

Unit-IV

Mental health and mental hygiene

- Concept of mental health and mental hygiene
- Characteristic of mentally healthy person
- Warning signs of poor mental health
- Promotive and preventive mental health strategies and services
- Defense mechanism and its implication
- Frustration and conflict – types of conflicts and measurements to overcome

Unit-V

- **Intelligence** – Meaning of intelligence – Effect of heredity and environment in intelligence,

classification, Introduction to measurement of intelligence tests – Mental deficiencies

- **Learning** – Definition of learning, types of learning, Factors influencing learning – Learning process, Habit formation
- **Memory**-meaning and nature of memory, factors influencing memory, methods to improve memory, forgetting

Unit VI:

Stress

- Hans Selye Model of stress. Lazarus and Folkman model of stress.
- Sources of stress. Stress, disease and health.
- Coping strategies and styles- emotion focused and problem focused
- Relaxation techniques

Unit VII:

Counselling

- Counselling-meaning and definition.
- Micro skills of counselling
- Psychotherapy- meaning and definition.
- Relaxation-types.
- Suicide and suicide prevention

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. Butcher, S.Mineka and J.M. Hooley (2007), Abnormal Psychology 13th, 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.

Skill Enhancement Course

Soft Skills

Learning objectives

- To give each student a realistic perspective of work and work expectations
- To help formulate problem solving skills, to guide students in making appropriate and responsible decisions
- To create a desire to fulfill individual goals, and to educate students about unproductive thinking, self-defeating emotional impulses, and self- defeating behaviors

Unit I

- Definition of soft skills, Soft skills and Hard Skills, Advantage of Soft Skills,
- Real life scenarios, Measurement of soft skills.
- Self Discovery, Definition of Self, Identification of Strengths and weakness of self, Setting goals, Personal beliefs, values and ethics.

Unit II

- Mindsets: Types of Mindsets, Developing a learning and Growth mindset,
- Developing a positive outlook towards life, Increasing emotional and Spiritual intelligence.
- People skills, Types of people - passive, assertive and aggressive people, Developing assertive personality, dealing with aggressive and submissive people.

Unit III

- Communication Skills: Definition of Communication, Verbal and Nonverbal communication, Telephone and internet communication, Common mistakes in communication.
- Interpersonal skills: Listening skills, Understanding body language, polite communication and people friendly attitude.

Unit IV

- Time management: Importance of punctuality, Efficient time handling,
- Avoiding leakage of time and procrastination
- Stress Management: Definition of Stress, Positive and negative stress. Handling major projects through effective delegation.

Unit V

- Organizational behavior: Definition of an organization, Understanding the rules and regulations of an organization, Creating an ideal working Environment.
- Professional attitude-Definition and developing an effective professional attitude.
- Leadership Skills: Developing a positive attitude, Presentation and public speaking skills, effective handling of the team and sub ordinates. Recognizing and encouraging talents in Sub ordinates.

Recommended books

1. Barun Mitra (2016), Personality Development and Soft Skills, 2nd edition, Oxford University Press
2. Alex K (2014), Soft Skills Paperback, S Chand & Company
3. Peggy Klaus (2008) The Hard Truth About Soft Skills: Workplace Lessons Smart People Wish They'd Learned Sooner 1st edition, HarperBusiness.
4. Sanjay Kumar, Pushp Lata (2018) Communication Skills Paperback 1st edition, Oxford University Press
5. John Hayes (1994), Interpersonal Skills: Goal Directed Behavior at Work, Routledge.
6. Gurdeep Singh Gujral (2013) Leadership Qualities for Effective Leaders, VIJ Books (India) Pty Ltd.

BSc. Optometry
III Semester

Core-7- Ocular Anatomy, Physiology and Biochemistry

Course outcome:

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

CO1: Demonstrate the acquisition of comprehensive knowledge about anatomical structure of the eyeball

CO2: Demonstrate the acquisition of comprehensive knowledge about physiological function of the eye

CO3: To be able to perform the ocular physiological tests

CO4: Demonstrate the acquisition of knowledge about biochemical aspect of the human eye

CO5: Demonstrate the skills to identify the structure and function of the eye.

Theory:

Unit I

09hrs

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 the 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

09hrs

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

15. Cranial nerves and their relation to the eye

Unit III

Ocular Physiology I

09hrs

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

09 hrs

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

09hrs

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. Color vision

3. Visual fields
4. IOP
5. Extra-ocular muscles
 - Action
 - Movements (uniocular, binocular)
 - Conjugate/disjugate
 - Testing of muscles
 - Diplopia charting
 - Accommodation
 - 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 Examination- 35 marks

1. To demonstrate the parts of the eye and visual system on a specimen
2. To demonstrate the testing of the following
 - Visual acuity
 - Color vision
 - Visual fields
 - IOP
 - Extra-ocular muscles action
3. To demonstrate urine sugar, urine protein and CBG

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. Whitehart, Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

III Semester
Core-8- Physical Optics

Course outcome:

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

CO1: Demonstrate the acquisition of comprehensive knowledge about light, prism, lens, mirror and filters

CO2: Demonstrate the skills of prisms, lenses, mirrors and filters in opticianry/optometry/ophthalmology

CO3: Demonstrate the acquisition of comprehensive knowledge of laser, fluorescence and phosphorescence.

Theory

Unit I

Elementary Basics Of Light

09 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

09 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
Glass slab; displacement without deviation; displacement without dispersion
4. Thick prisms: angle of prism, deviation produced by a prism, refractive index of the prism
5. Prisms: angular dispersion, dispersive power, Abbe's number
6. Definition of Crown and flint glasses: materials of high refractive index
7. Thin Prism- Definition; definition of prism diopter; deviation produced by a thin prism, its dependence on refractive index

Unit III

09 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

09 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

09 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 Examination - 35 Marks

1. Convex lens - power determination
2. Concave lens - power determination
3. Spherocylindrical lens – power determination
4. Prism - power determination

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. Subrahmanyam 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

Course Outcome:

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

CO 1: Demonstrate the acquisition of comprehensive knowledge about retinoscopy and refraction.

CO 2: Demonstrate the acquisition of practical skill for objective and subjective refraction.

CO 3: Demonstrate the capability to differentiate between ocular refraction, accommodation, axial length, magnification, depth of focus and depth of field.

CO 4: Demonstrate the capability to analyse the pathological defects of the refractive errors of the eye.

THEORY:

Unit I **09hrs**

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

Unit II **09hrs**

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

Unit III **09hrs**

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 **09hrs**

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

09hrs

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 ametropia, knapp's law
12. Ocular accommodation vs. Spectacle accommodation
13. Retinal image blur-depth of focus and depth of field

Practical

- Refraction and prescription of glasses in OPD
- Use of accessories in refraction room

Practical Examination: 35 marks

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

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. Al 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. W J Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006

III Semester

Skill Enhancement-1 Computer Application

Learning Objectives

- To know various aspects of basic components of computer
- To learn the modes of application of basic utility of the computer

Content

- **Introduction to Computer & Operating System: Introduction to computers** – Definition, Characteristics, Generation, Applications, Classifications, Hardware, Software, Computer Arithmetic & Number System, Decimal, Binary, Octal & Hexadecimal System.
- **Arithmetic Operations on Binary Numbers.** ASCII, EBCDIC, BCD codes, Fixed point & floating point representation of numbers.
- **Computer Organization & Architecture** – Memory hierarchy, Primary Memory - memory unit, SRAM, DRAM, SDRAM, RDRAM, Flash memory. Secondary storage devices include Magnetic Disk, Floppy Disks, Optical Disks, Magnetic Drum

Input Devices, Output Devices.

- **Softwares** – Introductory ideas of System Software, Application Software, Operating Systems, Translators, Interpreters, Compilers, Assemblers, and Generation of Languages.
- **Operating System** : Definition, Introductory ideas of single user and multi-user operating system, Time sharing, multitasking, multiprogramming, Batch Processing, on-line processing, spooling.
- **Introduction to Windows** – Windows basics, Windows Accessories, Miscellaneous Windows features, Web Features & Browsers.
- **Networks**: Different types of networks and their application
- **Internet and Intranet**: Similarities in Internet and Intranet, Differences in Internet and Intranet, Effective Internet use.
- **Computer Viruses**: Types of computer viruses, Use of Antivirus software
- **Application of Computer**: General and Health industry
- **Software**: Different types based on applications. Download open-source softwares. Convert one file format into another (Pdf to Word, Word to pdf, etc.). Ways to protect the documents

MS Office: (Theory & Practicals)

Word Processing:

- Introduction to Microsoft Word
- Font options in Microsoft Word
- Paragraph Formatting in Microsoft Word
- Heading Styles in Microsoft Word
- Editing Options in the Home Tab
- Clipboard & Format Painter Options in Microsoft Word
- Page Insert Options in Microsoft Word
- Inserting Tables in Microsoft Word

- Insert Pictures in Microsoft Word
- Shapes, Icons & 3d Models in Microsoft Word
- SmartArt Options in Microsoft Word
- Inserting Charts in Microsoft Word
- Text Box & Drop Cap Options in Microsoft Word
- Hyperlink in Microsoft Word
- Header, Footer & Page Number Options in Microsoft Word
- Equations & Symbols in Microsoft Word
- Water Mark, Page Color & Page Border Options in Microsoft Word
- Page Setup Options in Microsoft Word -
- Table of Contents & Table of Figures in Microsoft Word
- Endnote & Footnote Options in Microsoft Word
- Mailings Tab Options in Microsoft Word

Microsoft PowerPoint

- Introduction to Microsoft PowerPoint Interface
- Font & Slide Options in Microsoft PowerPoint
- Paragraph Formatting in Microsoft PowerPoint
- Drawing Tools in Microsoft PowerPoint
- Editing Options in the Home Tab
- Inserting Tables in Microsoft PowerPoint -
- Inserting Pictures in Microsoft PowerPoint
- Screenshot Option in Microsoft PowerPoint
- Inserting Photo Albums in Microsoft PowerPoint
- Inserting Icons in Microsoft PowerPoint
- Inserting 3D Models in Microsoft PowerPoint
- Inserting Smart Arts in Microsoft PowerPoint
- Inserting Charts in Microsoft PowerPoint
- Inserting Videos in Microsoft PowerPoint
- Design Tab Options in Microsoft PowerPoint
- Transitions Tab Options in Microsoft PowerPoint
- Animations Tab Options in Microsoft PowerPoint
- Slide Show Tab Options in Microsoft PowerPoint
- View Tab Options in Microsoft PowerPoint
- Built-in Presentation Templates in Microsoft PowerPoint

Microsoft Excel

- Introduction to Microsoft Excel Interface
- Basic Math Functions
- AutoSum Functions
- Sum IF Function & Remove Duplicates Option
- Sum IF & Sum IFs, Count IF & Count IFs Functions
- Sub Total Function

- Arrays & Sum Product Functions
- Other Math Functions
- Absolute & Relative References
- Formatting Techniques in Excel
- Excel Data Types
- Go to & Replace Options
- Auto Fill Options
- Copy, Paste & Paste Special Options
- Conditional Formatting
- Sort & Filter
- Excel Operators
- Equations Solving in Excel
- Errors in Excel Sheet
- Logical Function IF
- Logical Function IF Error
- Logical Function (IF, Nested IF, OR)
- Logical Function AND
- VLOOKUP Function
- VLOOKUP with Data Validation
- Nested VLOOKUP
- HLOOKUP Function
- Selecting the Chart
- Charts in Excel
- Tables in Excel
- Inserting Comments
- Inserting Hyperlink
- Text Functions
- Date, Time & Reference Functions
- Text to Columns Tool
- Data Consolidation
- Goal Seek Option
- Data Table Option

III Semester
Allied-3- Environment Science and Health

Learning Objectives

- To know various Environmental factors which affect Health
- To learn the modes of disease transmission and various control measures

Unit I

1a. 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

1b. 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

2a. Air

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

2b. 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

3a. Disposal of Wastes

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

3b. Excreta Disposal

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

Unit IV

Housing and Health and Medical Entomology

4a. 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.

4b. Medical Entomology

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

Unit V

Insecticides and Rodents

5a. Insecticides

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

5b. 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. 26th 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 -10 – Ocular Diseases I

Course Outcomes:

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge about anatomy and functions of structure of anterior chamber of eye

CO 2: Demonstrate the acquisition of comprehensive knowledge about pathophysiological basis of ocular diseases of anterior chamber of the eye

CO 3: Demonstrate the skills of history taking and examination of the ocular diseases of the anterior chamber of the eye.

Theory:

Unit I:

Orbit

09hrs

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

Lids

09hrs

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, Internal hordeolum, 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

Conjunctiva

09hrs

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

Cornea

09 hrs

1. 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

Uveal Tract and Sclera

09hrs

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: 35 Marks

Spotters of common cases

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

Course Outcomes:

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge about anatomy and functions of structure of Posterior chamber of eye

CO 2: Demonstrate the acquisition of comprehensive knowledge about pathophysiological basis of ocular diseases of posterior chamber of the eye

CO 3: Demonstrate the skills of history taking and examination of the ocular diseases of the posterior chamber of the eye.

SYLLABUS:

UNIT I

Retina and Vitreous

09 hrs

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

Lens

09 hrs

Applied Anatomy and Physiology

12. Clinical examination
13. Classification of cataract
 - a. Congenital and Developmental cataract
 - b. Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Toxic)
 - c. Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar.
14. Management of cataract (Non-surgical and surgical measures)
 - a. Pre-operative evaluation
 - b. Types of surgeries
 - c. Complications of cataract surgery
15. Displacement of lens: Subluxation, Dislocation
16. Lenscoloboma, Lenticonus, Microspherophakia.

UNIT III

Glaucoma

09hrs

Applied anatomy and physiology of anterior segment

17. Clinical Examination
18. Definitions and classification of glaucoma
19. Pathogenesis of glaucomatous ocular damage
20. Congenital glaucoma's
21. Primary open angle glaucoma
22. Ocular hypertension
23. Normal Tension Glaucoma
24. Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure, absolute glaucoma)
25. Secondary Glaucoma's
26. Management: common medications, laser intervention and surgical techniques

UNIT IV

Ocular Injuries

09hrs

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:

- Chemical injuries
- Thermal
- Electrical
- Radiational

Clinical approach towards ocular injury patients

UNIT V

Clinical Neuro-ophthalmology

09hrs

- Anatomy of visual pathway
- Lesions of the visual pathway
- Pupillary reflexes and abnormalities (Afferent Pupillary Defect, Wernicke's hemianopic pupil, Marcus gunn pupil, Argyll Robertson pupil, Adie's tonic pupil)
- Optic neuritis
- Anterior Ischemic optic neuropathy
- Papilledema
- Optic atrophy
- Cortical blindness
- Malingering
- Nystagmus
- Clinical examination

Practicals

Case Demonstration

Practical Examination: 35 Marks

Spotters of common cases - 4 cases

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

Course Outcomes:

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge of ophthalmic instruments

CO 2: Demonstrate the acquisition of comprehensive knowledge of pharmacology of drugs used in ocular diseases

CO 3: Demonstrate the skills of application of the ophthalmic instruments and appliances

Theory:

Unit I

Refractive Instruments

09hrs

Optotypes and MTF, Spatial Frequency

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

Unit II

Ophthalmic basic Diagnostic Instruments and Appliances

09 hrs

Pupilometer

19. Abberometer
20. Direct Ophthalmoscope
21. Indirect ophthalmoscope
22. Lensometer, Lens gauges or clock
23. Slit lamp
24. Tonometers
25. Syringing and lacrimal function test
26. Colour Vision Testing Devices
27. B-Scan
28. Fundus camera- FFA, Mydriatic, and Non-mydriatic

29. Wavefront Analyzer
30. Orthoptic Instruments (Synaptophore Only)
31. External eye photography
32. Orbscan
33. Pentacam - Corneal topographer Added

Unit III

Ophthalmic Instruments and Appliances

09hrs

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 fiber analyzer
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

09hrs

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

09hrs

Ophthalmic dyes

10. Local anaesthetics
11. Ophthalmic preservatives
12. Ocular lubricants
13. Ocular irrigating solutions
14. Ocular antiseptics and disinfectants
15. Anti-cataract agents
16. Contact lens solution
17. Chelating agents
18. 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

UNIT IV & V

Dilution of drug in different concentration

Practical Examination: - 35 marks

1. Use of all the ophthalmic instruments
2. Identification and uses of all the medications

Reference books

1. David Henson: Optometric Instrumentations, Butterworth- Heinemann, 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- R a v e n , 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

Biostatistics

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, Normal distribution, Divergence from normality; Skewness and kurtosis

Unit IV

- Census and Sampling Methods
- Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience 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; Quantitative vs. Qualitative, Conceptual vs. Empirical

Unit II

- Study Designs-Observational Studies
- Epidemiological study designs; Uses of Epidemiology, 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 and Randomized Trials, Application of study Designs in Medical Research

Recommended Books Recent Editions.

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. Getu Degu 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. 26th 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 4th Edition - Elsevier Saunders Publication.

Semester
Allied-4
Constitution of India

Learning Objective:

1. To know about the fundamental rights and duties of the Constitution.
2. To know about the sustainable development and special rights of the backward class and tribes.

Content:

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 Recent Editions.

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, 20

V Semester
Core-13- Clinical & Advanced Refractions and Contact Lens

Course Outcomes

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge about advanced refraction

CO 2: Demonstrate the acquisition of comprehensive knowledge about contact lenses

CO 3: Demonstrate the capability to assess the refractive power of eye and manage it appropriately.

CO 4: Demonstrate the skills of effective communication with patients and team members.

Theory:

Unit I-

Clinical & Advanced Refractions

09hrs

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 - 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

09hrs

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

09hrs

1. Review of anatomy and 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 and its Solution III

09hrs

1. Insertion and removal technique
2. Do's and Dont's
3. Indications and contraindications
4. Parameters / designs of contact lenses & terminology
5. Care and maintenance of RGP contact lens
6. Manufacturing rigid and soft contact lenses - various methods
7. Cleaning, Rinsing, and disinfectant agents and their importance
8. Lubricating and enzymatic cleaners

UNIT V -

Contact Lens-IV

09hrs

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- 35 marks

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

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,VA Henry. Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

V Semester
Core-14- Clinical and Advanced Orthoptics

Course Outcomes:

At the end of the course student should be able to

CO1: Demonstrate the acquisition of comprehensive knowledge of orthoptics/binocular vision.

CO 2: Demonstrate the skills of history taking and examination of ocular accommodation, convergence anomalies, phoria, tropia and paralytic squint.

CO 3: Demonstrate the acquisition of comprehensive knowledge of pediatric refraction and visual acuity.

Theory:

UNIT I

Orthoptics

09 hrs

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

UNIT II

Orthoptics

09hrs

1. Maddox Rod
2. Maddox Wing
3. Synaptophore
4. Manifest Concomitant Squint

UNIT III

Orthoptics

09hrs

- Paralytic Squint
- Head Posture and Its Significance
- Hess Screening and Its Interpretations
- Pleoptics
- Occlusion -Types and Uses

UNIT IV

Orthoptics

09hrs

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

UNIT V
Orthoptics

09hrs

1. Pediatric Visual Acuity Assessment
2. Pediatric 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: 35 marks

Case spotters - 2

Recommended Books:

1. A.k. Khurana Textbook of Squint and Orthoptics
2. Pradeep Sharma: Strabismus Simplified, New Delhi, First edition Modern Publication 1999.
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, Lippincott Williams & Wilkins publishers

V Semester

Core-15- Community Ophthalmology, Low Vision Care and Eye bank

Course Outcomes

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge of epidemiology of blindness

CO 2: Demonstrate the acquisition of comprehensive knowledge and skills of screening for eye care and blindness

CO 3: Demonstrate the acquisition of comprehensive knowledge about low vision

CO 4: Demonstrate the acquisition of comprehensive knowledge and understanding of eye bank

Theory

UNIT I

Community Ophthalmology and Eye Bank I

09hrs

1. Concepts of Community Ophthalmology - I
2. Concepts of Community Ophthalmology - II
3. The Epidemiology of Blindness (General principles) - I
4. The Epidemiology of Blindness (General principles) - 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

09hrs

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

09hrs

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

09hrs

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

09hrs

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

Eye Screening Programme & Surveys

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: 35 marks

1. Identification of storage media
2. Identification of instruments related to collection of eye Identification of food products rich
3. in vitamin A
4. Low visual aid spotters

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 C Thomas 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: Dermatology

Learning Objective:

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

Introduction

- Transformation/Revolution of TeleMedicine/dermatology Consultation
- The Need for Teledermatology Consultation in COVID-19 Pandemic
- Scope and Purpose/Indications for TeleMedicine/dermatology Consultation
- TeleMedicine /dermatology Consultation and its Advantages
- TeleMedicine/dermatology Consultation in Various Subspecialties
- Cutaneous and esthetic surgery
- Geriatric care
- Paediatric care
- Emergency dermatology
- Tools for Telemedicine consultation
- Video-conference-store and forward telemedicine/dermatology-Hybrid
- Mobile /cellular Telemedicine
- Teledermatology consultation Diagnostic Agreement and Patient satisfaction
- The Organization and Approach to a Case for Teledermatology Consultation
- Prerequisites for a Successful Tele/Medicine/dermatology Consultation
- Limitations of teledermatology consultation

V Semester
Allied - 5 - Medical Ethics

Learning Objectives:

- To know about the basics and importance of ethics in the profession

Content:

General Considerations of Medical Ethics

- Medical Ethics - Introduction
- Three Cor Contents in Medical Ethics - Best Interest, Autonomy Unrights
- Doctors, Patient & Profession

Special Considerations of Medical Ethics

- Consent
- Confidentiality
- Genetics
- Reproductive Medicine
- Mental Health
- End of life and Organ Transplantation
- Research & Clinical Trials

Recommended Books Recent Editions:

1. Medical Ethics & Law, The Cor Curriculum
2. Author - Tony Hope Atla
3. Reference book No. 16715 Center Library

VI Semester
Core 16 - Optometric Optics & Dispensing Optics

Course Outcomes

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge of manufacturing and quality testing of lenses

CO 2: Demonstrate the acquisition of comprehensive knowledge of spectacle

CO 3: Demonstrate the skills to dispense optics in different conditions.

Theory:

UNIT I

Optometric Optics

09hrs

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

09hrs

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

09hrs

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, Polycarbonate lenses
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

09hrs

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

09hrs

1. Components of spectacle prescription & interpretation, transposition, Add and near power relation
2. Frame selection -based on spectacle prescription, professional requirements, age group, 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, lens enhancements)
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
 - 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: 35 marks

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

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, 3rd edition, 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, 3rd edition, Butterworth - Heinemann, 2007
8. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth - Heinemann, 2002

VI Semester

Core -17- Contact Lens, Practice Management & Occupational Optometry

Course Outcomes:

At the end of the course student should be able to

CO 1: Demonstrate the acquisition of comprehensive knowledge of utilization of contact lens

CO 2: Demonstrate the skills of maintenance of contact lens

CO 3: Demonstrate the knowledge and skills required to assess and prevent the occupational hazard.

Theory:

UNIT I -

Contact Lens 1

09hrs

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

09hrs

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 III

Contact Lens 3

09hrs

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 IV

Advanced Contact lens

09hrs

1. Scleral Contact lens
2. Orthokeratology lens
3. Rose K- series contact lens
4. Contact lens and Myopia control
5. Customized contact lens
6. Corneal ectasia and advanced contact lens fitting Added

UNIT V

Occupational Optometry

09hrs

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

Practical examination-35 marks

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

Reference Books:**a. Contact lens**

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

b. Occupational Optometry

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

Course outcomes:

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

CO1: To demonstrate the acquisition of knowledge and understanding the effect of systemic diseases on eye

CO2: To demonstrate the acquisition of knowledge and understanding the effect of nutrition and metabolism on eye

CO3: First aid in eye care

CO4: To demonstrate the skills to prepare the OT for eye surgeries

CO5: To demonstrate of efficacy of assisting the team.

Theory:

UNIT I

Systemic Diseases

09hrs

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, hypothyroidism, 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

09hrs

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, Epstein barr 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

09hrs

1. Common tropical medical ailments- malaria, typhoid, dengue, filariases, onchocerciasis, cysticercosis, leprosy
2. Nutritional and metabolic disorders: obesity, hyperlipidemias, 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

09hrs

1. Introduction to Ocular in general.
2. Asepsis: How to achieve
3. Anesthetic agents: which and when indicated
4. OT Sterilization procedures
5. Sterilization procedures of OT Instruments

UNIT V

Ophthalmic OT and techniques-II

09hrs

1. Maintenance of instruments and equipment's: ophthalmic instruments
2. Maintenance of instruments and equipment's: surgical, orthoptics instruments
3. Minor OT procedures
4. Assisting as an optometrist at OT- Refractive surgery, Cataract surgery, squint surgery

Practical

- Case
- Demonstration

Practical Examination: 35 Marks

1. Spotters
2. Identification of OT instruments
3. Assessment of OT techniques

Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
2. Systemic Diseases and the Eye by Jack J Kanski
3. A.J. ROSSENBLOOM Jr & M.W. MORGAN: Vision and Aging, Butterworth- Heinemann, Missouri, 2007.
4. Davidson's Principles and Practice of Medicine
5. K.V. Krishnad's - Textbook of Medicine

VI Semester
Elective 2- Practice Management

Learning Outcomes:

- To know about how to establish practice with maintenance of stock and accounts.

Course instructor:

Hospital administration department

Content:

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

Learning objective:

1. To know about the various quality concepts
2. To learn about the Hospital information system, inventory control, equipment operations management and biomedical waste management.

Content:

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 policies
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 wastes.