

## COLLEGE VISION AND MISSION

### VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

### MISSION

#### M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

#### M2: Research and Innovation:

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

#### M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

#### M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

## DEPARTMENT OF OPTOMETRY

### VISION AND MISSION

#### VISION

Be aware of the changing needs and demands in health professionals which may lead to changes in practice and education patterns

#### MISSION

##### M1: knowledge sharing:

- Advancing the frontiers of optometric knowledge through evidence-based research, and translating that knowledge to improve patients' lives worldwide.

##### M2: Collaborative learning:

- Accomplishes this mission through collaboration with educators, administrators, , students, industry, healthcare organizations, and other stakeholders through its education, research, advocacy and development activities.

##### M3: Career Development:

- Enriching lives by enabling independent optometrists to reach their full potential.

##### M4: Consistent Improvement

- Provide opportunities for training and learning in service-oriented leadership, responsible citizenship, and the development of democratic values, institutions and practice.



**DISTRIBUTION OF TEACHING HOURS FOR 1<sup>ST</sup> YEAR COURSES**

Course	Lecture	Practicals	Total
ANATOMY	60	40	100
PHYSIOLOGY	60	40	100
BIO-CHEMISTRY	60	40	100
MICROBIOLOGY	60	40	100
PATHOLOGY	60	40	100
ENGLISH	25	25	50
COMPUTER SCIENCE	25	25	50
CLINICAL POSTING	-	300	300
<b>TOTAL</b>	<b>350</b>	<b>550</b>	<b>900</b>

**DISTRIBUTION OF MARKS FOR 1<sup>ST</sup> YEAR COURSES**

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total		Theory+ Practical	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20CTAT11	ANATOMY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT12	PHYSIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT13	BIOCHEMISTRY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT14	MICROBIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT15	PATHOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT16	ENGLISH	-	-	-	-	-	-	-	-	-	-	50	25	50	25	50	25
U20CTAT17	COMPUTER SCIENCE	-	-	-	-	-	-	-	-	-	-	50	25	50	25	50	25
<b>TOTAL</b>		-	-	-	-	-	-	<b>500</b>	<b>200</b>	-	-	-	-	<b>400</b>	<b>170</b>	<b>900</b>	<b>450</b>

. \*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practical (Test 10 marks + Attendance 5 marks+ record books 5Marks)

Minimum Marks for Pass is (i) 40% in Theory & Practicals separately.

(ii) 50% in aggregate of both Theory & Practicals combined.

Minimum Marks for Pass in Ancillary Subjects is 50%.

**DISTRIBUTION OF TEACHING HOURS FOR 2<sup>ND</sup> YEAR COURSES**

Course	Lecture	Practicals	Total
OPTOMETRIC OPTICS	60	40	100
DISPENSING OPTOMETRY & OPTOMETRIC INSTRUMENTS	60	40	100
VISUAL OPTICS 1&2	60	40	100
PHYSICAL OPTICS & GEOMETRICAL OPTICS	30	-	30
PHARMACOLOGY	30	-	30
ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE	30	-	30
CLINICAL POSTING	-	1200	1200
<b>TOTAL</b>	<b>270</b>	<b>1320</b>	<b>1590</b>

**DISTRIBUTION OF MARKS FOR 2<sup>ND</sup> YEAR COURSES**

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total		Theory+ Practical	
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20OPTT21	OPTOMETRIC OPTICS 1 & 2	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT22	DISPENSING OPTOMETRY & OPTOMETRIC INSTRUMENTS	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT23	VISUAL OPTICS 1&2	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT24	PHYSICAL OPTICS & GEOMETRICAL OPTICS	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
U20CTAT21	PHARMACOLOGY	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
U20CTAT22	ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
<b>TOTAL</b>								<b>450</b>	<b>195</b>					<b>180</b>	<b>72</b>	<b>630</b>	<b>315</b>

\*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practicals (Test 10 marks + Attendance 5 marks+ record books 5 Marks)

Minimum Marks for Pass is (i) 40% in Theory & Practicals separately.

(ii) 50% in aggregate of both Theory & Practicals combined.

Minimum Marks for Pass in Ancillary Subjects is 50%.

**DISTRIBUTION OF TEACHING HOURS FOR 3<sup>RD</sup> YEAR COURSES**

Course	Lecture	Practicals	Total
LOW VISION AID AND OCCUPATIONAL OPTOMETRY	60	40	100
CONTACT LENS AND COMMUNITY OPTOMETRY	60	40	100
SYSTEMIC & OCULAR DISEASES	60	40	100
ORTHOPTICS	60	40	100
BIOSTATISTICS AND ETHICS	30	-	30
CLINICAL POSTING	-	1200	1200
<b>TOTAL</b>	<b>270</b>	<b>1360</b>	<b>1630</b>

**DISTRIBUTION OF MARKS FOR 3<sup>RD</sup> YEAR COURSES**

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20OPTT31	LOW VISION AIDS AND OCCUPATIONAL OPTOMETRY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT32	CONTACT LENS AND COMMUNITY OPTOMETRY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT33	SYSTEMIC & OCULAR DISEASES	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20OPTT34	ORTHOPTICS	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT31	BIOSTATISTICS AND ETHICS	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
<b>TOTAL</b>		-	-	-	-	-	-	<b>450</b>	<b>185</b>	-	-	-	-	<b>240</b>	<b>94</b>	<b>690</b>	<b>345</b>

\*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practical (Test 10 marks + Attendance 5 marks+ record books 5 Marks)

Minimum Marks for Pass is (i) 40% in Theory & Practical separately.

(ii) 50% in aggregate of both Theory & Practical combined.

Minimum Marks for Pass in Ancillary Subjects is 50%.

**I-YEAR SYLLABUS**

<b>U20CTAT11</b>	<b>ANATOMY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**HUMAN BODY AS A WHOLE**

1. Anatomical position
2. Fundamental planes of the body
3. Anatomical terms (superior, inferior, medial, lateral, proximal and distal)
4. Organization of human body
5. Parts of microscope and its functions
6. Epithelium
  - Types
  - functional importance with examples

**LOCOMOTOR SYSTEM**

**Skeletal system**

1. Bone composition
2. Long bone
  - Parts
  - blood supply with clinical implication
3. Identify major bones of the body and their parts
4. Classification of synovial joints with associated movements
5. Articular surface of key joints in human body
6. Parts of a muscle and its arrangement
7. Classification of muscles with functional importance
8. Muscles of upper limb, lower limb and head and neck with actions

**NERVOUS SYSTEM**

Classification and components of nervous system

1. Spinal cord
  - Coverings
  - Extent
  - Organization of grey matter and white matter with clinical implication
2. Brainstem
  - Parts
  - Location of cranial nerve nucleus with functions
3. Cerebellum
  - Location
  - Parts
  - Functional subdivisions
  - blood supply and functions



## Curriculum and Syllabi R-2020

4. Cerebrum
  - Surfaces
  - important sulci and gyro and functional correlation
5. Thalamus
  - location and functional correlation
  - Striatum, hippocampus and Amygdala – their location and function.
6. Cranial nerves
  - Names
  - location of nucleus with clinical correlation

### **CIRCULATORY SYSTEM**

1. General plan of circulatory system
2. Difference between systemic and portal circulation
3. Microanatomy of artery and vein
4. Thoracic cavity
  - Bony cage
  - muscles – intercostal muscles, diaphragm
5. Mediastinum – sub-divisions, contents
6. Heart
  - Coverings
  - External features
  - Chambers
  - Blood supply
  - Nerve supply.
7. Major vessels of the heart
8. Veins of upper limb and lower limb - varicose veins and their importance
9. Lymphatic system – components, microanatomy of lymphoid organs(lymph node, tonsil, thymus,spleen)

### **RESPIRATORY SYSTEM**

1. Nasal cavity, Para-nasal air sinuses, nasal septum, lateral wall of nose – location and functions
2. Pharynx – subdivision and structures present
3. Larynx – cartilages, muscles and nerve supply
4. Trachea and bronchial tree – extent, broncho-pulmonary segments and their clinical importance
5. Pleura – types, reflections, recesses and its clinical importance
6. Lung – location, relations, lobes, fissures, surfaces.

### **DIGESTIVE SYSTEM**

1. Abdomen
  - Quadrants
  - Musculature of wall
  - Formation in guinal canal
  - Rectus sheath and their importance



## Curriculum and Syllabi R-2020

2. Components of digestive system.
3. Mouth - Tongue, palate – Structure of tongue
4. Salivary glands – parotid, sub-mandibular – Brief anatomy and structure
5. Stomach
  - Position
  - Parts
  - Blood supply
  - Nerve supply
  - Lymphatic drainage
  - Relations & structure
6. Small intestine –subdivisions
7. Large intestine in general - sub-divisions, microscopic structure. Specific -caecum and appendix
8. Accessory organs of digestive system
  - Liver
  - Pancreas
  - Extra hepatic biliary apparatus -Gross features, relations, blood supply

## **EXCRETORY AND REPRODUCTIVE SYSTEMS**

1. Kidney
  - Location
  - Parts
  - Relations and blood supply
2. Ureter & urinary bladder
  - Location
  - Parts
  - Relations and blood supply
3. Male reproductive system
  - Testis
  - Spermatic cord and its coverings
4. Female reproductive system
  - Ovary
  - Uterus – parts and supports
5. Accessory organs of reproduction
  - Prostate gland
  - Mammary gland

## **ENDOCRINE SYSTEM**

1. List the endocrine glands and their location
2. Thyroid and parathyroid glands
  - Location
  - Relations
  - Blood supply
  - Functions & clinical importance
3. Pituitary gland
  - Location



## Curriculum and Syllabi R-2020

- Parts
  - Relations
  - Blood supply
  - Functions & clinical importance
4. Supra renal gland
- Location
  - Parts
  - Relations
  - Blood supply
  - Functions & clinical importance

### REFERENCE BOOKS :

1. Basics in human anatomy for B.Sc. Paramedical courses, second edition – Priya Ranganath and Leelavathy
2. Anatomy & Physiology in health & illness, 11<sup>th</sup> edition - Ross & Wilson
3. Vishram Singh, "Clinical and Surgical Anatomy", Elsevier Health Sciences, 2<sup>nd</sup> Edition, 2019.
4. Sampath Madhyastha, "Manipal Manual of Anatomy For Allied Health Sciences", CBS Publishers & Distributors, 3<sup>rd</sup> Edition, 2020.
5. Richard Drake A. Wayne Vogl Adam Mitchell, "Gray's Anatomy for Students – Companion Work Book", Churchill Livingstone Publications, 4<sup>th</sup> Edition, 2019.
6. A K Detta, "Principles Of General Anatomy", Current Books International , 8<sup>th</sup> Edition, 2018.
7. Nafis Ahmad Faruqi, "Human Osteology", CBS Publishers & Distributors, 3<sup>rd</sup> Edition, 2018.
8. Inderbir Singh, "Human Histology", Jaypee Publications, 9<sup>th</sup> Edition, 2019.





## ANATOMY LAB

### PRACTICALS - 40 hrs

1. Identification of the parts of the microscope.
2. Identification of the epithelium in a given histological slide.
3. Demonstrate the parts of the long bone.
4. Identification of the bones and joint of the body with the articular surfaces (skeleton or X-rays)
5. Identification of the important muscles in upper limb, lower limb and head and neck.
6. Identification of the parts of the brain (cerebrum, cerebellum, brainstem, spinal cord)
7. Identification of the cardiac chambers in a specimen.
8. Identification of the major vessels of heart – aorta and pulmonary trunk.
9. Identification of the cardiac field in chest X-ray.
10. Identification of the nasal cavity, naso pharynx, trachea, lung and pleura in a given specimen.
11. Identification of the lung shadow, costophrenic angle in a chest X-ray.
12. Identification of the stomach, pancreas, liver, small intestine and large intestine specimens.
13. Identification of the stomach, intestinal shadows in plain or contrast abdomen X – ray.
14. Identification of the kidney, Ureter and urinary bladder in specimen.
15. Identification of the renal pelvis, Ureter and urinary bladder in intravenous pyelogram
16. Identification of the thyroid gland in cadaveric specimen



<b>U20CTAT12</b>	<b>PHYSIOLOGY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **THE CELL**

- Cell Structure and functions of the various organelles.
- Endocytosis and Exocytosis
- Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis)

### **CARDIO VASCULAR SYSTEM**

- Physiology of the heart
- Heart sounds
- Cardiac cycle
- Cardiac output.
- Auscultatory areas.
- Arterial Pressures,
- Blood Pressure
- Hypertension
- Electro cardiogram(ECG)

### **BLOOD:**

- Composition of Blood, functions of the blood and plasma proteins, classification and protein.
- Pathological and Physiological variation of the RBC.
- Function of Hemoglobin
- Erythrocyte Sedimentation Rate (ESR).
- Detailed description about WBC •Total count (TC), Differential count (DC) and functions.
- Platelets–formation

### **RESPIRATORY SYSTEM:**

- Respiratory movements.
- Definitions and Normal values of Lung volumes and Lung capacities.

### **EXCRETORY SYSTEM**

- Normal Urinary output
- Micturition
- Renal function tests, renal disorders.

### **REPRODUCTIVE SYSTEM**

- Formation of semen and spermatogenesis.
- Brief account of Menstrual Cycle ,oogenesis



## **CENTRAL NERVOUS SYSTEM**

- Functions of CSF
- Reflexes.
- Sympathetic and parasympathetic outflow Impulse conduction
- Structure of neuron
- Degeneration and regeneration of nerve fibers Cerebral blood flow

## **ENDOCRINE SYSTEM**

- Functions
- Pituitary
- Thyroid
- Parathyroid
- Adrenal
- Pancreatic Hormones

## **DIGESTIVE SYSTEM**

- Physiological Anatomy of the GIT.
- Food Digestion in the mouth, stomach ,intestine
- Absorption of foods
- Role of bile indigestion.

## **SPECIAL SENSES**

### **REFERENCE BOOKS:**

1. Raj Kapoor, " Physiology Practical Manual for Allied Health Sciences", CBS Publishers and Distributors Pvt Ltd, 3<sup>RD</sup> Edition.
2. Marya, "Medical Physiology", CBS Publishers and Distributors Pvt Ltd, 4th Edition.
3. CL Ghai, "Text Book of Practical Physiology", Jaypee Brothers Medical Publishers, 9<sup>th</sup> Edition.
4. Vidya Rattan, "Hand Book of Human Physiology", Jaypee Brothers, 7<sup>th</sup> Edition.
5. Robin R. Preston & Thad Wilson, " Lippincotts Illustrated Reviews in Physiology", Lippincott Williams and Wilkins, 2<sup>nd</sup> Edition.



## PHYSIOLOGY LAB

### PRACTICAL – 40 hrs

1. Microscope
2. Estimation Hemoglobin
3. Blood grouping
4. BT and
5. RBC count
6. WBC count
7. PCV
8. ESR
9. Osmotic fragility
10. DLC
11. Measurement of Pulse,HR,RR,Temperature,SPo2
12. Measurement of Blood pressure and auscultate Heart sounds
13. Spotters



<b>U20CTAT13</b>	<b>BIOCHEMISTRY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **CELL AND CELL ORGANELLES**

Structure and functions of Cell organelle, membrane structure and transporters

### **CARBOHYDRATES**

Classification, properties and functions of carbohydrates, Glycolysis, Diabetes Mellitus

### **LIPIDS**

Classification and functions of lipids, Normal value and functions of Lipoproteins, ketone bodies and ketosis, pathogenesis of Atherosclerosis, cardiac biomarkers

### **PROTEINS**

Classification of Amino acids, Classification and properties of proteins, Normal value of plasma proteins and their functions.

### **ENZYMES**

Classification, co-enzymes, Iso-enzymes, enzyme measurement units, enzyme profile in different disorders

### **VITAMINS**

Functions and deficiency manifestations of fat soluble vitamins , Co-enzyme form , functions and deficiency manifestations of water soluble vitamins.

### **MINERALS**

Functions and disorders related to minerals like calcium, iron, copper, zinc, iodine, sodium, potassium and chloride.

### **NUTRITION**

Calorific value of foods, Basal Metabolic Rate, Protein Energy Malnutrition.

### **ORGAN FUNCTION TEST**

Liver function Test, Renal Function Test, Thyroid Function Test

### **ACID BASE BALANCE AND IMBALANCE**

pH, Henderson- Hasselbalch equation, buffers, Disorders of Acid base imbalance

### **SAMPLE COLLECTION AND TRANSPORT**

Types of samples, Anticoagulants, Phlebotomy, Sample Transport



**REFERENCE BOOKS:**

1. Allan Gaw, "Clinical Biochemistry – An Illustrated Colour Text", Churchill Livingstone, 3<sup>rd</sup> edition
2. Nanda Maheshwari, "Clinical Biochemistry ", Jaypee brothers medical publishers, 2<sup>nd</sup> edition
3. Victor Rodwell, "Harper's Illustrated Biochemistry", McGraw-Hill Education, 31<sup>st</sup> edition
4. DmVasudevan, "Text Book of Biochemistry", Jaypee Brothers Medical Publishers , 9<sup>th</sup> edition
5. Harold Varley, "Practical Clinical Biochemistry", CBS, 6<sup>th</sup> edition



## BIOCHEMISTRY LAB

### PRACTICALS – 40 hrs

1. Common Laboratory equipments and glasswares
2. Good Laboratory practices and biomedical waste management.
3. General and colour reactions of carbohydrates.
4. General reactions of proteins .Colour reactions of amino acids.
5. Point of care testing
6. Normal and abnormal constituents of urine analysis



<b>U20CTAT14</b>	<b>MICROBIOLOGY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **GENERAL BACTERIOLOGY**

- **History of Microbiology:** Theory of biogenesis and a biogenesis pioneers in Microbiology (Robert Koch, Louis Pasteur, Joseph lister, Paul enrich, and Koch Postulates.
- **Morphology of bacteria:** Classification based on shape, Anatomy of the bacterial cell, defective forms of bacteria, Bacterial appendages, Bacterial Spore
- **Physiology of bacteria:** Autotrophs, Heterotrophs, Bacterial growth and replication, Bacterial Growth curve, Bacterial count, Bacterial nutrition, Factors affecting the growth.
- **Sterilization & Disinfection:** Introduction, Physical methods, Chemical methods, methods of sterilization and disinfection of medical and laboratory equipments, Disinfection of clinical samples and environmental surfaces in laboratory and hospitals, Testing foris infectant.
- **Culture media:** Introduction, basal media, synthetic media, special media with emphasis on their uses.
- **Culture methods:** Aerobic and Anaerobic culture methods.

### **IMMUNOLOGY**

- Infection - types, Route, source of infections, vector, factors affecting virulence, Exotoxins endotoxins
- Antigen – types factors affecting antigencity
- Antibodies (Immunoglobulin's)- general properties, IGg, IGA, IGM,IGE,IGD
- Immunity- Innate immunity, Factor affecting & mechanisms of innate immunity Acquired immunity, active & passive
- Ag – Ab reactions – general properties, slide & tube agglutination, precipitation (slide flocculation) prozone phenomono, coombs test, immune fluorecence assay, Elisa (direct & Indtect), Immuno chromatography , Applications of Antigen antibodies reactions
- Immune system - cells of lymphoreticular system- lymphocytes, phagocytes structure and functions
- Immune response – humoral& cell mediated immune response, monoclonal antibodies factor affecting anti bodies, adjuvants ,immuno suppressive agents, interleukins , immunological tolerance
- Hypersensitivity- Types- immediate &delayed , Type I, IV Hypersensitivity

### **SYSTEMIC BACTERIOLOGY**

Bacterial infections – morphology, pathology, clinical feature, lab diagnosis, treatment prevention including immune prophylaxis of the following pathogens. No description of culture characters and biochemical reactions

- Staphylococcus
- Streptococcus
- Enterococcus
- Pneumococcus
- C.diphtheriae
- Clostridium tetani
- Clostridium perfringens
- Mycobacterium tuberculosis
- Mycobacterium leprae





## Curriculum and Syllabi R-2020

- E.coli
- Klebsiella Pneumoniae
- Salmonella typhi
- Pseudomonas saeruginosa
- Treponema pallidum
- Vibrio cholera

### **VIROLOGY**

- Introduction and General properties of viruses morphology and general characters susceptibility to physical chemical agents , viral haemagglutinations, cultivations of viruses, cytopathic effects
- Morphology, pathology, clinical feature, lab diagnosis, treatment prevention including immune prophylaxis of the following pathogens:
  - Herpes simplex
  - Varicella zoster
  - Dengue
  - Rabies
  - Hepatitis A,B,C
  - H.I.V
  - Influenza virus
  - Corona virus
  - Measles , mumps & rubella

### **MYCOLOGY**

Introduction – Morphology, General characteristics, classifications, outline of lab diagnosis, Morphology Pathology, clinical feature, lab diagnosis, treatment prevention of the following pathogens

- Candida
- Cryptococcus
- Aspergillus spp

### **PARASITOLOGY**

Introduction, General Characteristics, Classifications, Brief description of Morphology, Pathogenesis, Lab diagnosis, Prevention of the following Parasites:

- E.Histolytica
- Giardia
- Malarial Parasite
- Roundworm
- Hookworm



## Curriculum and Syllabi R-2020

### **APPLIED MICROBIOLOGY**

- BMWM
- Immunization
- H.A.I & H.I.C
- Standard Precaution

### **REFERENCE BOOKS:**

1. Richard A Harvey, "Lippincotts Illustrated Reviews in Microbiology", Lippincotts Williams & Wilkins, 3<sup>rd</sup> Edition.
2. Thao Doan, "Lippincotts Illustrated Reviews Immunology", Lippincotts Williams & Wilkins, 2<sup>nd</sup> Edition.
3. Apurba Sastry, "Textbook Of Essentials Of Practical Microbiology", Jaypee Brothers,
4. 1<sup>st</sup> Edition.
5. Baveja, "Textbook Of Practical Microbiology, Arya Publications", 4<sup>th</sup> Edition.
6. JayaramPanikar, " Textbook Of Microbiology", Orient Black swan Pvt Limited, 9<sup>th</sup> Edition.
7. Baveja, "Textbook Of Microbiology", Arya Publications, 6<sup>th</sup> Edition.
8. Baveja, "Textbook Of Parasitology" , Arya Publications, 4<sup>th</sup> Edition



## MICROBIOLOGY LAB

### PRACTICALS – 40 hrs

1. Microscope – compound ,DGM, Florescence Microscope
2. Morphology of bacteria
3. Motility – hanging Drop & WET MOUNT
4. Sterilization &Disinfection - Demonstration of equipments and methods
  - Hot air oven, autoclave, ETO, heap filter, syringe filter physical & biological indicators of sterility
  - Packing of glassware and instruments for sterilizations
  - Visit to CSSD
5. Demonstration and use of Centrifuge, & distillation still
6. Preparation of smear from specimen and simple staining
7. Grams stain
8. Culture media
9. Slide and tube agglutination
10. Immuno chromatography
11. Study of bacteria pathogens
  - Staphylococcus
  - Streptococcus
  - Pneumococcus
  - C.diphtheriae
  - Clostridium tetani
  - Clostridium perfringens
  - Mycobacterium tuberculosis
  - Mycobacterium leprae
12. Serological test (ASO, CRP, RAF, Widal, VDRL, HIV, HBV ,Dengue)
13. Study of fungal pathogens
  - Candida
  - Dermatophytes
14. BMWM
15. PPE
16. Standard precautions
17. Examination of stools for parasites
  - E. histolytica
  - G.lamblia
  - Roundworm
  - Hook worm
  - Strongyloides



**U20CTAT15**

**PATHOLOGY**

L	P	Hrs
60	40	100

Introduction to Pathological Terms, techniques  
Cellular adaptations  
Inflammation (Acute & Chronic) Transudate & Exudate  
Wound healing and repair.

**HEMODYNAMICS**

- Oedema
- Thrombus
- Emboli
- Shock

**IMMUNOLOGY**

- Hypersensitivity reactions
- HIV
- Transplant rejection
- SLE

**NEOPLASIA**

- Benign and malignant tumors
- In situ growth
- Familial cancers
- Metastasis

**GENETICS**

- Chromosome aberrations
- congenital & developmental anomalies

**ENVIRONMENTAL**

- Radiation injury
- Nutritional deficiencies

**INFECTIONS**

- Leprosy
- Syphilis
- Tuberculosis
- Malaria
- Filaria



## Curriculum and Syllabi R-2020

Anaemia and lab investigations  
Blood grouping & cross matching  
WBC disorders – Leukemias

### **BLEEDING AND PLATELET DISORDERS**

- BT ( bleeding time)
- CT ( clotting time)
- PT ( prothrombin time)
- APTT ( activated partial thromboplastin time )

### **RESPIRATORY SYSTEM**

- Asthma
- COPD
- Pneumonia & Lung tumours
- pneumoconiosis

### **CVS (CARDIO VASCULAR SYSTEM)**

- Atherosclerosis
- Aneurysms
- Hypertension
- Myocardial Infarction
- Rheumatic heart disease
- Infective endocarditis

### **GIT (gastro intestinal tract)**

- Peptic ulcer
- Carcinoma Stomach
- Amoebiasis
- Typhoid
- TB Intestine
- Carcinoma Intestine

### **HEPATOBIILIARY**

- Liver abscess
- Hepatitis
- Cirrhosis
- Chole Cystitis
- Tumours of liver & gall bladder



## Curriculum and Syllabi R-2020

### **RENAL**

- Nephrotic syndrome
- Nephritic syndrome
- Renal calculi
- Renal failure
- RCC ( renal cell carcinoma)
- CPN ( chronic poly nephritis)

### **BREAST**

- Benign lesions of breast
- Carcinoma breast

### **FGT**

- Carcinoma cervix and endometrium
- Ovarian tumours
- PCOD ( polycystic ovarian disease)
- Leiomyoma

### **CNS (central nervous system)**

- Hydrocephalus
- Meningitis
- Encephalitis
- Cerebro vascular Disease

### **ENDOCRINE**

- Diabetes
- Thyroid disorders

### **EYE**

- Infections
- Tumors
- Metabolic diseases

### **BONE**

- Osteomyelitis
- Arthritis
- Osteoporosis
- Bone tumours



**REFERENCE BOOKS:**

1. Nayak Ramadas, "Textbook Of Pathology For Allied Health Sciences" ,Jaypee Brothers 1<sup>st</sup> Edition.
2. Nanda Maheshwari, "Clinical Pathology/Hematology and Blood Banking" (For DMLT Students), Jaypee Brothers, 3<sup>rd</sup> Edition.
3. Nayak Ramadas, "Histopathology Techniques & Its Management", Jaypee Brothers, 1<sup>st</sup> Edition.
4. Ramnik Sood, "Concise Book of Medical Laboratory Technology Methods and Interpretations", Jaypee Brothers, 2<sup>nd</sup> Edition.
5. Dacie&Lewis, "Practical Hematology", Elsevier Health – Uk, 11thEdition.
6. Lippincotts Illustrated Reviews in Pathology.



## **PATHOLOGY LAB**

### **PRACTICALS – 40 hrs**

1. Urine Examination
2. Hemoglobin Estimation
3. Blood Grouping
4. Peripheral Blood Smear staining
5. Differential count
6. Gross Pathology
7. Microscopic Slides
8. Instruments





<b>U20CTAT16</b>	<b>ENGLISH</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>25</b>	<b>25</b>	<b>50</b>

### **COMMUNICATION**

- Communication at the workplace
- Human needs and communication “Mind mapping” Information communication

### **COMPREHENSION PASSAGE**

- Reading purposefully
- Understanding what is read
- Drawing conclusion
- Finding and analysis

### **EXPLAINING**

- How to explain clearly
- Explaining procedures
- Giving directions

### **WRITING BUSINESS LETTERS**

- How to construct correctly Formal language, Address, Salutation
- Body and Conclusion

### **REPORT WRITING**

- Reporting an accident
- Reporting what happened at a session
- Reporting what happened at a meeting

### **PRACTICAL**

- The clinical experience in the wards and bedside nursing will provide opportunity for students to fulfill the objectives of learning language
- Assignment on writing and conversation through participation in discussion debates seminars and symposia. The students will gain further skills in task oriented communication.



**REFERENCE BOOKS:**

1. Selva Rose. 1997, Career English for Nurses. Published by: Orient Blackswan Ltd
2. Oxford advanced Learners Dictionary, 1996
3. Quirk Randolph and Greenbaum Sidney, 1987. A University Grammar of English, Hong Kong: Longman group (FE) Ltd/Pearson.
4. Thomson A.J. and Maituiet A.V. 1987, A Practical English Grammar, Delhi: Oxford University Press.
5. Gimson A.C.1989, An Introduction to pronunciation of English. Hodder Arnold; 4th Revised edition (1 May 1989).
6. O'Connor J.D, 1986. Better English pronunciation. Cambridge: University Press
7. By water F.V.A. 1982, Proficiency Course in English. London: 1- lodder and Strongliton.
8. Roget S.P. 1960, Thesaurus of English Words & Phrases, London: Lowe & Brydone Ltd. 1960.



<b>U20CTAT17</b>	<b>COMPUTER SCIENCE</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>25</b>	<b>25</b>	<b>50</b>

### **TYPING TEXT IN MS WORD**

- Inserting tables in a document.
- Formatting the text–using different font sizes, bold, italics
- Bullets and numbering
- Pictures, file insertion
- Aligning the text and justifies
- Choosing paper size
- Adjusting margins
- Header and footer, Inserting page No's in a document Printing a file with options
- Using spell check and grammar

### **CREATING TABLE IN MS EXCEL**

- Cell editing–Using formulas and functions Manipulating data with excel
- Using sort function to sort numbers and alphabets
- Drawing graphs and charts using data in Excel–Auto formatting–Inserting data from other work sheets.

### **PREPARING NEW SLIDES USING MS POWERPOINT**

- Inserting slides – Slide transition and animation – Using templates
- Different text and font sizes – Slides with sounds – Inserting clipart, pictures, tables and graphs– Presentation using wizards

### **INTRODUCTION TO INTERNET**

Using search engine –Google search–Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – Email ID creation

- Sending messages – Attaching files in E-mail ID
- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word
- Create email merge document using MS-word to prepare greetings for 10 friends
- Preparing a Slides how with transition, animation and sound effect using MS-PowerPoint
- Customizing the slides how and inserting pictures and tables in the slides using MS- Power Point
- Creating a work sheet using MS-Excel with data and use of functions
- Using MS-Excel prepare a worksheet with text, date time and data
- Preparing a chart and pie diagrams using MS-Excel
- Using Internet for searching, uploading files, downloading files and creating E-mail ID



## Curriculum and Syllabi R-2020

### **REFERENCE BOOKS:**

1. Fundamentals of computers- V. Rajaraman-2004
2. Absolute beginners guide to computer basics-Michael Miller. Que Publisher, September 1, 2009.
3. Networking concepts and technology – by Deepak Kalkadia, Francesco DiMambro, Prentice hall publisher, May 25, 2007
4. Operation system concepts (8<sup>th</sup> edition) by Abraham Silberschatz, Peter Baer Galvin, Greg Gangne, Wiley Publisher, Feb 13, 2009.
5. Microsoft office 2013 for Dummies – by Wallace Wang, July 31, 2013.



**II-YEAR SYLLABUS**

<b>U20OPTT21</b>	<b>OPTOMETRIC OPTICS I &amp; II</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**OPTOMETRIC OPTICS I**

**SPECTACLE LENSES**

- Introduction To Spectacle Lenses
- Forms Of Lenses - Cylindrical And Sphero Cylindrical Lenses
- Properties Of Crossed Cylinders
- Toric Lenses
- Toric Transportation
- Astigmatic Lenses
- Axis Direction Of Astigmatic Lenses
- Obliquely Crossed Cylinders
- Sag Formula
- Miscellaneous Spectacle Lenses
- Vertex Distance And Vertex Power
- Tilt Induced Power
- Aberrations In Ophthalmic Lenses
- Fresnel Prisms, Lenses And Magnifiers
- Manufacture Of Glass Lens Surfacing
- Principle Of Surface Generation And Glass Placements Lens Quality
- Faults In Lens Material Faults On Lens Surface
- Inspecting The Quality Of Lenses Toughened Lenses Ophthalmic Lenses
- Definition Of Prisms Units Of Prism Power
- Thickness Difference And Base – Apex Notation Dividing, Compounding And Resolving Prisms Rotary Prisms And Effective Prism
- Power In Near Vision Prismatic Effect Decentration Prentice's Rule
- Prismatic Effect Of Sphero Cylinders And Plano Cylinders
- Differential Prismatic Effects
- Spectacle Frames, Frames – Types & Parts

**CLASSIFICATION OF SPECTACLE FRAMES:**

Material weight temple position coloration Frame construction frame measurements and markings

**OPTOMETRIC OPTICS II**

- Tinted and protective lenses
- Characteristics of tinted lenses
- Absorptive glasses
- Polarizing filters
- Photo chromic filters
- Reflecting filters
- Bifocal lenses
- Trifocal lenses



## Curriculum and Syllabi R-2020

- Progressive addition lenses
- Lenticular lenses
- Reflections from spectacle lenses, ghost images, reflections in bifocals at the dividing line
- Anti-reflection coating, Anti-scratch coating, Anti-fog coating, Mirror coating, Edge coating, hard multi coating(HMC)
- Field of view of lenses
- Size, shape and mounting of ophthalmic lenses
- A spherical lenses

### **REFERENCE BOOKS:**

1. Clinical Optics by Troy E Fannin & Theodore Grosvenor:Butterworth-Heinemann,1996
2. Principles of Ophthalmic Lenses by M. Jalie:, Edition 3, 1980
3. Ophthalmic lenses and Dispensing by Mo Jalie, Butterworth Heinemann Elsevier, 2008



<b>U20OPTT22</b>	<b>DISPENSING OPTOMETRY &amp; OPTOMETRIC INSTRUMENTS</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **DISPENSING OPTOMETRY**

- Clinical experiences in verification and dispensing of ophthalmic materials outlined in Ophthalmic Optics
- Course and Dispensing Optics
- Special practical instructions in centering, marking and mounting the lenses of all designs, types, shapes and sizes in accordance with frame and facial measurements
- Visit to lens manufacturing workshops
- Video session on fitting of progressive lenses
- ANSI standards Dispensing Instrumentation Pupillometer Pliers PCD Air blower Distometer
  1. Abbe's value, specific gravity, optical density, Panto scopic flit
  2. Patients selection, fitting Ms of PALs, Selection of designs
  3. Case study
    - Problems, orientated dispensing optics
    - Recent developments
    - Special purpose frames
    - Safety wear

### **PRACTICALS**

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

### **REFERENCE BOOKS:**

1. The fine art of prescribing glasses, Benjamin Milder, Butterworth Heinemann,
2. Systems of ophthalmic dispensing, Brook & Borish, Butterworth Heinemann
3. Spectacle frame dispensing: H Obstfeld: Butterworth Heinemann
4. Clinical Optics, Troy Fannin ,Theodore Grosvenor, Butterworth Heinemann



## **OPTOMETRIC INSTRUMENTS**

- Binocular Vision
- Simple And Compound Microscope – Oil Immersion Eyepiece
- Refractive Instruments
- Test Chart Standards
- Choice Of Test Charts
- Trial Case Lenses – Best Forms Refractor (Phoropter) Head Units –Auto Refractors
- Optical Considerations Of Refractor Units
- Trial Frame Design
- Near Vision Difficulties With Units And Trial Frame Retino Scope – Types Available
- Adjustment Of Retinoscopes – Special Features Cylinder Retinoscopy
- The Interpretation Of Objective Findings
- Special Subjective Test – Polarizing And Displacement –Etc.,
- Simultan Test Projection Charts Illumination Of The Consulting Room
- Special Instruments
  - Brightness acuity test
  - Vision analyzer Pupil meter
  - Video acuity test
  - Nerve fiber analyzer
- Ophthalmoscopes and related devices
- Design of ophthalmoscopes – illumination/viewing
- Ophthalmoscope disc Filters for ophthalmoscopy
- Indirect ophthalmoscopes
- The use of the ophthalmoscope in special cases
- Lensometer, lens gauge or clock
- Slit lamp, Slit lamp systems Viewing microscope systems Scanning laser devices
- Slit lamp accessories Mechanical design in instruments
- Tonometer
  - Tonometer principles
  - Types of tonometers and standardization
  - Use and interpretation of tonometers
- Fundus camera
  - The fundus camera-principles
  - The fundus camera –techniques
  - External eye photography –apparatus
- Keratometer and corneal topography
- Refraction meter
- Orthoptic Instruments -haloscopes
- Orthoptic Instruments – home devices
- Orthoptic Instruments – pleoptics Historical instruments
- Colour vision testing devices
- Colour confusion/Hue discrimination/Colour matching, FM-100 hue test
- Fields of vision and screening devices
- Perimeter and the visual field
- Illumination of field testing instruments





## Curriculum and Syllabi R-2020

- Projection perimeters
- Screening devices for field defects
- Results of field examination
- Vision screeners

### **PRINCIPLES VISION SCREENERS**

- Details Analysis of screener results
- Bowl perimeters
- Goldmann and Humphrey Vision Analyzer
- Optical devices and electronic (Low vision) aids
- Ophthalmic Ultra sonography Biometry/Ultrasound/'A' Scan/'B' Scan/UBM
- Electro diagnostics ERG/VEP//EOG
- NFA

### **REFERENCE BOOKS:**

1. Optometric Instrumentation by David B Henson, Butterworth-Heinemann, 1996
2. Clinical Procedures in optometry by John F. Amos, Jimmy D. Bartlett, Lippincott
3. Primary care optometry by Theodore Grosvenor Primary, 4th edition, Butterworth
4. Basic and Clinical Science Course, Section 3: Clinical Optics by Dimitri T. Azar MD
5. Perimetry: With and Without Automation by Douglas R. Anderson, Mosby, 1987
6. Clinical Visual Optics- Bennett & Rabbett's 4th edition, Butterworth Heinemann, 2007
7. Visual Optics and Refraction- David O. Michaels, 3rd revised edition, Mosby 1985



<b>U20OPTT23</b>	<b>VISUAL OPTICS I &amp; II</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **VISUAL OPTICS I**

- Review of Geometric Optics Vergence and power Conjugacy, object space and image space
- Sign convention
- Spherical refracting surface
- Spherical mirror; catoptric
- power Cardinal points
- Magnification Optics of Ocular Structures Cornea and aqueous Crystalline lens, Vitreous Curvature of the lens and ophthalmo phakometry
- Axial and axis of the eye Measurement of the optical constants of the eye
- Corneal curvature and thickness
- Keratometry Curvature of the lens and ophthalmo phakometry Axial and axis of the eye
- Refractive anomalies and their causes
- Etiology of refractive anomalies
- Contributing variabilities and their ranges
- Populating distributions of anomalies
- Optical component measurements
- Growth of the eye in relation to refractive errors

### **PRACTICAL**

- Study of Purkinje images I and II
- Study of Purkinje images III and IV
- Measurement of corneal curvature
- Measurement of Corneal thickness
- Mathematical models of the eye–Emmetropia
- Mathematical models of Hypermetropia
- Mathematical models of myopia
- Conjugate points – demonstration – worked examples
- Axial and refractive hyperopia – worked examples
- Axial and refractive myopia – worked examples
- Visual acuity charts
- Effect of lenses in front of the eye
- Effect of prisms in front of the eye
- Vision through pinhole, slit, filters, etc.

### **REFERENCE BOOKS:**

1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998
3. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006
4. Primary Care Optometry- Theodore Grosvenor, 4th edition, Butterworth



## **VISUAL OPTICS II**

### **REFRACTIVE CONDITIONS**

- Emmetropia
- Myopia
- Hyperopia
- Astigmatism
- Anisometropia
- Aniseikonia
- Presbyopia
- Aphakia and Pseudoaphakia
- Correction and Management of Amblyopia

### **FAR AND NEAR POINTS OF ACCOMMODATION**

- Correction of spherical ametropia
- Axial versus refractive ametropia
- Relationship between accommodation and convergence; A/c ratio

### **RETINOSCOPY**

- Principles and methods
- Speed of reflex and optimum condition
- Retinoscopy – dynamic/static Review of objective refractive methods Review of subjective refractive methods Cross cylinder method for astigmatism Astigmatic Fan test Difficulties in objective tests and their avoidance Transposition of lenses Spherical equivalent Prescribing Prisms Binocular refraction

### **EFFECTIVE POWER OF SPECTACLES**

- vertex distance effects
- Ocular refraction versus spectacle refraction
- Ocular accommodation versus spectacle accommodation
- Spectacle magnification and relative spectacle magnification
- Retinal image blur; depth of focus and depth of field

### **PRACTICALS**

- Photometry
- Visual acuity; stereo acuity in emmetropia, Myopia and pseudo myopia and visual acuity
- Myopic correction – subjective verification – monocular and binocular
- Hypermetropia – determination of manifest error subjectively
- Hypermetropic correction: subjective verification
- Demonstration of astigmatism
- Use of slit and Keratometry to find the principal meridians
- Astigmatism: fan – subjective verification tests
- Astigmatism: Cross-Cyl. – Subjective verification test
- Measurement of accommodation: near and far points and range



## Curriculum and Syllabi R-2020

- Presbyopia correction and methods: accommodative reserve, balancing the relative accommodation and cross grid test
- Methods of differentiating axial and refractive ametropia
  - Practice of Retinoscopy – Emmetropia
  - Practice of Retinoscopy – Spherical ametropia
  - Practice of Retinoscopy – Simple astigmatism
  - Practice of Retinoscopy – Compound hyperopia
  - Practice of Retinoscopy – Compound myopia
  - Practice of Retinoscopy – Oblique astigmatism
  - Practice of Retinoscopy – in media opacities
  - Practice of Retinoscopy – in irregular astigmatism
  - Practice of Retinoscopy – in strabismus and eccentric fixation
  - Interpretation of cyclo plegioretinoscopic findings
  - Prescription writing
  - Binocular fraction
  - Photo refraction
  - Vision therapy
  - Exercises for vergence

### **REFERENCE BOOKS:**

1. Abrams D: Duke elders Practice of Refraction, Edition 9, 1998
2. Theodore Grosvenor, third edition, Primary care Optometry
3. Borish, second edition, Clinical Refraction
4. Clinical procedures in Optometry



**U20OPTT24**

**PHYSICAL OPTICS &  
GEOMETRICAL OPTICS**

**L P Hrs**  
**30 - 30**

**PHYSICAL OPTICS**

**LIGHT**

- Nature of Light-Newton's Corpuscular Theory
- Huygens's wave Theory
- Maxwell's electromagnetic Theory
- Einstein's quantum Theory
- Dual Nature theory Properties of light
- Spectrum of light Visible light and the eye
- Fechner's Law
- Weber's law Measurement of Light
- Radiometry
- Photometry

**INTERFERENCE**

- Interference phenomena in Optics
- Constructive Interference
- Destructive interference Coherence
- Spatial Coherence
- Temporal coherence
- Applications of interference
- Thomas Young's experiment
- Interference in thin films
- Lloyd's single mirror
- interference due to reflected and transmitted light Wedge shaped thin films
- Testing of planeness of surface Newton's rings experiment
- Refractive index of liquid Non-reflecting films Interferometer
- Michelson interferometer
- Fabry
- Perotinter ferometer

**DIFFRACTION**

- Phenomenon of Rectilinear Propagation
- Fresnel's diffraction
- Fraunhofer diffraction
- Applied aspects of diffraction
- Single slit, qualitative and quantitative Zone plate Circular aperture

**POLARIZATION**

- Polarization of transverse waves
- light as transverse waves Double refraction Nicol prism



## Curriculum and Syllabi R-2020

- Nicol prism as an analyzer Elliptically & Circularly polarized light Optical activity
- Fresnel's experiment
- Biquartz Applications of polarized light

### **SPECTRUM**

- Sources of spectrum: Bunsen-carbon-mercury-sodium Emission and absorption spectra
- Classification of emission spectra Solar spectrum
- Ultraviolet Spectrum
- Infra red spectrum
- Electromagnetic spectrum

### **SCATTERING**

- Applied Aspects
- Glare effect
- light reduction effect
- Photo electric effect
- Raman Effect
- LASER Optical instruments Spectrometer

Simple and compound microscope Telescope Resolving power of optical instruments Resolving power of the eye Magnifying power of simple and compound microscope, telescope

### **PRACTICALS**

- Newton's Ring's-radius of curvature-refractive index of lens
- Newton's Ring's-refractive index of a liquid
- Air wedge-thickness of a wire(hair)
- Grating-wavelength determination
- Dispersive power of a grating
- Grating – minimum deviation & Wavelength determination
- Reflection grating
- Diffraction at a straight wire
- Resolving power of a telescope
- Polari meter
- Fresnel's biprism experiment
- Thickness of thin glass plate

### **REFERENCE BOOKS:**

1. Optics by Brijlal and Subramanian.
2. Radiation & Optics – Stone Mc.Graw Hill
3. Fundamentals of Optics-Jenkins & White, McGraw Hill



## GEOMETRIC OPTICS I

Stimulus of vision Laws of reflection and refraction Total internal reflection The Ray model  
Fermat's principle Refraction through spherical surfaces

### INTRODUCTION:

- Lenses-Spherical lens-Cylindrical lens-Contact lens
- Divergence and convergence of wave fronts by spherical surfaces
- Definition of diopter
- Vergence
- Working of spherical lenses
- Primary and secondary focal points
- Prism diopter: Prentice's law – deviations-Ophthalmic prisms – thin and thick
- Refraction at single Spherical or plane surfaces: convex – concave
- Curvature & Sagittal
- Vergence & dioptric power
- Nodal points & nodal ray
- Lateral magnification and angular magnification
- Snell's law of refraction
- Thin lenses: lenses in contact-lenses separated by a distance.
- Two lens systems- dioptric & vergence power-(Object-image)relationships
- Application: calculation of image points -dioptric powers in reduced systems using vergence techniques
- Thick lenses – cardinal points -front and back vertex powers reduced system
- Dioptric power of equivalent lenses.
- Application – to calculate to the equivalent dioptric power of thick meniscus lens
- Plano convex vertex powers
- Position of principal planes
- Dioptric powers using reduced systems. (Matrix theory and lens matrices)
- Cylindrical and spherocylindrical lenses: location of foci-image planes-principle meridians-refraction by a cylindrical lens
- Calculation of power in different meridians
- Spherocylindrical lenses
- Circle of least confusion
- Refraction through a spherocylindrical lens
- Writing Rx in different forms (+cyl., -cyl., meridional)
- Additional spherocylinders-oblique-cylinders
- Stops, Pupils and Ports: Entrance pupil & exit pupil (size & location) Field stop Entrance port & exit port, field of view, vignetting Depth of field and depth of focus



### **ABERRATIONS:**

- Spherical
- Coma
- Oblique astigmatism
- Curvature of field
- Distortion
- Chromatic
- Thin prisms and Mirrors
- Unit of measurement (prism diopter)Prism
- Deviation in prism
- Combination of thin prisms
- Dispersive power of prism
- Achromatic prisms
- Planar & spherical reflection in mirrors
- Magnification in mirrors
- Lens/mirror systems

### **PRACTICALS**

- Refraction through as lab
- Caustic curve for a glass lab
- Refraction at a curved surface
- I-d curve for a prism – pin method
- Spherometer and lens gauge
- Single optic lever
- Double optic lever
- Spherical mirrors
- Spherical lenses
- Critical angle – glass and water
- magnifying power of a simple and a compound microscope
- Magnifying power of a telescope

### **GEOMETRIC OPTICS II**

#### **INTRODUCTION:**

- Vergence and vergence techniques revised. Lens power, prism power, cylindrical lenses
- Gull strand's schematic eyes, visual acuity, Stile Crawford experiment Errors of refraction:
- Emmetropia and ametropia
- Correction of ametropia with lenses
- Myopia
- Hypermetropia
- Astigmatism-Causes of Astigmatism-Types of Astigmatism-Application-for eg.,to calculate
- dioptric power -angular magnification of spectacles in aphakic-presbyopic patients
- Aphakia
- Presbyopia
- Thin lens model of the eye – angular magnification – magnification of microscope, telescope, Spectacle and relative spectacle magnification. Applications – To calculate the angular magnification, dioptric power of spectacles, spectacle magnification, entrance and exit pupils, vertex distances





## Curriculum and Syllabi R-2020

- Laser optics – basic laser principles – spontaneous and stimulated emission. Coherence – spatial, temporal, laser pumping- population inversion optical feedback
- Gas lasers, solid lasers, helium-neon laser- Argon-ion laser-ruby laser Monocular laser- carbon dioxide, excimer laser - Semiconductor lasers. Lasers in medicine ophthalmic applications

### **PRACTICALS**

- Spectrometer – minimum deviation
- Spectrometer – I-d curve
- Spectrometer – I-I' curve
- Spectrometer – narrow angled prism
- Refractive index by microscope
- Focimeter
- Dispersive power of a prism
- Toric lens and meniscus lens
- Nodal slide
- Boy's method – radius of curvature
- Liquid lens
- Refractive index of lenses
- Powers of concave and convex mirrors

### **REFERENCE BOOKS:**

1. Mirrors, Prisms & Lenses-Southall, Dover
2. N.Subramanyam & BrijLal: A text book of Optics, S.Chand & Co.
3. Geometric, Physical & Visual Optics-Michael P.Kealing
4. Aberrations of Optical systems-W.T.Welford
5. Introduction to Geometrical optics-Milton Katz



### **CLINICAL EXAMINATION OF VISUAL SYSTEM**

- History of the Ophthalmic subject Ocular symptoms The past prescription – its influence
- Visual acuity testing – distance and near and colour vision
- Examination of muscle balance
- Slit lamp examination Examination of eye lids, conjunctiva and sclera Examination of cornea Examination of iris, ciliary body and pupil Examination of lens
- Examination of intraocular pressure and examination of angle of anterior chamber
- Ophthalmoscopy – Direct and Indirect
- Examination of fundus (vitreous and disc), (choroids and retina)
- Examination of lacrimal system
- Examination of the orbit
- Macular function test
- Visual field charting (central),(peripheral).
- Neuro – ophthalmological examination

### **REFERENCE BOOKS:**

1. Practice of refraction by Duke-Elder published by Elsevier
2. A Text Book of Ophthalmology by E. Ahmed published by PH1
3. Practical Manual of Ophthalmology by Vinod Lohya published by Jaypee
4. Clinical Examination of Ophthalmic Cases by M. L. Agarwal published
5. Basic Ophthalmology by RenuJogi published by Jaypee



**U20CTAT21**

**PHARMACOLOGY**

<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>30</b>	<b>-</b>	<b>30</b>

### **INTRODUCTION**

Routes of administration, Pharmacokinetics, Pharmacodynamics, Drugs acting on Autonomic nervous system.

Parasympathetic agents and blocking agents. Sympathetic agents and blocking agents Autocoids and respiratory system

- Non-steroidal anti-inflammatory drugs.
- Drugs for cough and bronchial asthma
- Respiratory stimulants and antihistamines Drugs acting on CNS
- Sedatives and hypnotics and alcohol
- General anaesthetics
- Anti-epileptics and Opioids

### **DRUGS ACTING ON PNS**

- Smooth muscle relaxants
- Local anaesthetics Drugs acting on CVS
- Drugs for congestive cardiac failure
- Anti-hypertensive drugs
- Anti-arrhythmic drugs
- Anti-anginal drugs and diuretics
- Drugs used in treatment of shock Drugs acting on blood
- Anti-thrombotic drugs
- Anti-coagulants
- Fibrinolytic drugs
- Lipid lowering drugs
- Antimicrobial drugs Drugs acting on GIT

### **DRUGS USED FOR ENDOCRINE DISORDERS**

- Insulin, oral hypoglycemic drugs Corticosteroids
- Thyroxine and anti-thyroid drugs

General concepts and resistance. Antibacterial drugs Antiviral drugs Anti-fungal drugs .Antiseptics and disinfectants Management of poisoned patients

### **REFERENCE BOOKS:**

1. Lippincott's Illustrated Review's in Pharmacology -Seventh edition
2. Medical Pharmacology by Padmaja Uday Kumar- Seventh edition
3. Pharmacology for medical graduates by Tara Shanbhag – Fourth edition



<b>U20CTAT22</b>	<b>ENVIRONMENTAL SCIENCE &amp; COMMUNITY MEDICINE</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>30</b>	<b>-</b>	<b>30</b>

**ENVIRONMENTAL SCIENCE (15 hrs)**

1. Introduction to environment
2. Sources, health hazards and control of environmental pollution
3. Water
4. The concept of safe and wholesome water
5. The requirements of sanitary sources of water
6. Understanding the methods of purifications of water on small scale and large scale various biological standards, including WHO guidelines for third world countries
7. Concept and methods for assessing quality of water.
8. Domestic refuse, sullage, human excreta and sewage their effects on environment and health, methods and issue related to their disposal.
9. Awareness of standards of housing and the effect of poor housing on health.
10. Role of arthropods in the causation of diseases, mode of transmission of arthropods borne diseases, methods of control

**REFERENCE BOOKS:**

1. Text book of Environmental studies for Under Graduate courses by Erach Barucha

**COMMUNITY MEDICINE (15 hrs)**

1. Epidemiology and Epidemiological Methods AIM / Approach /Rates
2. Mortality / Morbidity and Disease transmission
3. Epidemiology of Communicable diseases
4. Epidemiology of Non-communicable diseases
5. Bio-medical waste Management
6. Disaster Management
7. Information, Communication and Health Education.
8. Screening for disease
9. History of Public Health
10. Organization of Health services
11. Health Care Delivery system

**REFERENCE BOOKS:**

1. Park's text book of Preventive and social Medicine – 23<sup>rd</sup> Edition(2015)
2. Community Medicine with recent advances by A.H. SuryaKantha
3. Short text book of preventive and social medicine by G.N.Prabhakar
4. Text book of community medicine – By Sunderlal.



**III-YEAR SYLLABUS**

<b>U20OPTT31</b>	<b>LOW VISION AIDS &amp; OCCUPATIONAL OPTOMETRY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**LOW VISION AIDS**

(Theory: 30 Hrs, Practicals: 20 Hrs)

- Identifying the low vision patient
- History
- Diagnostic procedures in low vision case management
- Optics of low vision aids
- Refraction, special charts. Radical retinoscopy
- Evaluating near vision: Amsler grid and field defects, prismatic scanning
- Demonstrating aids – optical, Non-optical, Electronic
- Teaching the patient to use aids including eccentric viewing training when necessary
- Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near
- Spectacle mounted telescopes and microscopes
- Children with low vision
- Choice of tests, aids in different pathological conditions
- Light, glare and contrast in low vision care and rehabilitation
- Bioptic telescopes
- Optical devices to help people with field defects Contact lens combined system

**REHABILITATION OF THE VISUALLY HANDICAPPED PRACTICALS:**

- Refraction, special charts., Radical retinoscopy
- Evaluating near vision: Amsler grid and field defects, prismatic scanning
- Demonstrating aids – optical, Non-optical, Electronic
- Guidelines to determining magnification and selecting low vision aids for distance, intermediate and near
- Spectacle mounted telescopes and microscopes
- Choice of tests, aids in different pathological conditions
- Contact lens combined system
- Rehabilitation of the Visually handicapped

**REFERENCE BOOKS:**

1. Essentials of Low Vision Practice, Richard L. Brilliant OD
2. Low Vision Manual - Jackson and Wolffsohn
3. The Art and Practice of Low Vision (2nd Edition) - P. D. Freeman and R. T. Jose
4. Low Vision Principles & Practice - C Dickinson

## **OCCUPATIONAL OPTOMETRY**

(Theory: 30 hours, Practicals:20 Hrs)

- Introduction to occupational health, hygiene and safety International Bodies like ILO, WHO, National bodies like labour Institutes, National Institutes of Occupational Health, National Safety Council, etc.
- Acts and Rules: Factories Act and Rules-Workmen's Compensation Act – ESI Act, etc
- Occupational diseases/ occupation related diseases caused by – physical agents, chemical agents and biological agents
- Occupational hygiene, environmental monitoring Recognition, evaluation and control of hazards Illumination – definition, measurements and standards
- Occupational safety
- Causes of accidents
- Vision, lighting, colour and their role Accident analysis Accident prevention
- Ocular and visual problems of occupation Electromagnetic radiation Ionizing Non-ionizing – Infra red Ultra violet Microwave, Laser Injuries – Mechanical, chemical Toxicology – Metals, chemicals
- Prevention of occupational diseases
- Medical examination / medical monitoring
- Pre-employment / pre-placement Periodic
- Personal protective equipment General Goggles, face shields, etc Selection and use Testing for standards
- Standards Visual standards for jobs
- Problems of special occupational groups Drivers, Pilots and others
- Field work – submission of reports Visits to : Regional Labour Institute, selected industries
- Visual display units (terminals) --VDU/VDT Contact lens and work Pesticides – general and visual and ocular defects
- Role of Optometrists – promotion of general and visual health and safety of people at work.

### **REFERENCE BOOKS:**

1. Indian Association of Occupation Health, Guidelines on Pre-Employment Medical Examination, Pune 1998
2. Barbara A.Plog, Patrica J. Quinlan. Fundamentals of Industrial Hygiene. 5<sup>th</sup> Edition, 2002
3. John Ridley & John Channing. Safety at work. 5<sup>th</sup> Edition 1999, reprinted 2000,2001
4. Stephen Konz, Steven Johnson. Work Design-Industrial Ergonomics 2000
5. Salvatore R. Dinardi. The Occupational Environment – Its Evaluation and Control 1997
6. Linda Rosenstock & Mark R.Cullen. Textbook of Clinical Occupational and Environmental Medicine, 1994



<b>U20OPTT32</b>	<b>CONTACT LENS &amp; COMMUNITY OPTOMETRY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**CONTACT LENS**

(Theory: 30 Hrs, Practicals: 20 Hrs)

- History Of Contact Lens
- Corneal Anatomy And Physiology
- Corneal Physiology And Contact Lens
- Preliminary Measurements And Investigations
- Slit Lamp Bio Microscopy
- Contact Lens Materials
- Optics Of Contact Lenses
- Glossary Of Terms: Contact Lenses
- Indications And Contra Indications Of CL
- Rigid Gas Permeable Contact Lens Design
- Soft Contact Lens Design
- Keratometry, Placido's Disc, Topography
- Fitting Philosophies (Introduction To Contact Lens Fitting)
- Handling Of Contact Lenses
- Fitting Of Spherical Soft CL And Effects Of Parameter Changes
- Astigmatism; Correction Options
- Fitting Spherical RGP CL. Low DK High DK
- Effects Of RGP CL Parameter Changes On Lens Fitting
- Fitting In Astigmatism
- Fitting In Keratoconus
- Fitting In Aphakia, Pseudophakia
- Lens Care & Hygiene Instructions Compliance
- Follow Up Post Fitting Examination
- Follow Up Slit Lamp Examinations
- Cosmetic Contact Lenses
- Fitting Contact Lens In Children
- Toric Contact Lenses
- Bifocal Contact Lenses
- Continuous Wear And Extended Wear Lenses
- Therapeutic Lenses / Bandage Lenses
- Contact Lens Following Ocular Surgeries
- Disposable Contact Lenses, Frequent Replacement And Lenses
- Use Of Specular Microscopy And Tachymetry In CL
- Care Of Contact Lenses, Contact Lens Solutions
- Complications Of Contact Lenses
- Contact Lens Modification Of Finished Lenses
- Instrumentation In Contact Lens Practice
- Checking Finished Lens Parameters
- Contact Lens – Special Purposes – Swimming, Sports, Occupational Etc.,
- Recent Developments In Contact Lenses
- Review Of Lenses Available In India
- Current Contact Lens Research



## **PRACTICAL**

### **Preliminary examination of CL candidate**

#### **Part 1:** Anterior segment evaluation

- a. Slit lamp examination of anterior segment
- b. Assessment of corneal sensitivity
- c. Lid tonus
- e. Blink rate and type

#### **Part 2:** Assessment of tears

- a. Schirmer's test I & II
- b. TBUT
- c. Tear prism height

#### **Part 3:** Measurement of ocular dimensions

- a. HVID & VVID
  - b. Palpebral aperture
  - c. Corneal curvature
  - d. Measurement of pupil size in normal (room light), dim and bright illumination
  - e. Selection of trial contact lens parameters (from HVID, keratometry reading and subjective acceptance). Writing trial lens parameters.
- Identification of type of contact lens – soft, RGP, soft toric, scleral, cosmetic, prosthetic, lenses for keratoconus (Rose-K, keraSoft, hybrid, etc)
  - Contact lens verification – CL power, total diameter, blends (in RGP), base curve, type, quality
  - Insertion & Removal of contact lenses Identification of correct side of soft contact lens (Taco test)
  - Insertion & Removal of soft contact lenses.
  - Insertion & Removal of RGP contact lenses
  - Cleaning procedure for soft & RGP contact lenses
  - Soft CL Fit assessment, over-refraction & final lens parameters
  - Fitting principle in toric soft contact lenses
  - Fit assessment of RGP contact lenses – observation of static & dynamic fitting characteristics in steep, flat and optimum fitting RGP lenses.
  - Examination of old contact lens patient
  - CL examination for deposits, tear, scratches, type of lens
  - Vision, comfort, ocular changes, old CL fit assessment & over-refraction

### **REFERENCE BOOKS:**

1. IACLE Modules 1-5
2. Clinical manual of Contact Lenses, Edward S. Bennett and Vinita Allee Henry, Lippincott,
3. Williams and Wilkins, 2008
4. Robber B Mandell: Contact lens Practice, hard and flexible lenses, Charles C. Thomas, 3<sup>rd</sup> Edition, 1981, Illinois, USA
5. 1981, Illinois, USA
6. Ruben M Guillon: Contact lens practice, 994, 1<sup>st</sup> Edition





## **COMMUNITY OPTOMETRY**

(Theory: 30 hours, Practical: 20 Hrs)

- Philosophy of Public Health
- History of public health medicine
- History of public health optometry (including epidemiology, man power, projections, community reimbursement mechanisms)
- Health care systems
- Organization of health services (principles of primary, secondary and tertiary care)
- Determinants of health care delivery system
- Planning of health services (including relevant legislation and implications to optometric practice)
- Health economics
- Health manpower protection and in the practice of ophthalmology
- Third party involvement in financing health care services (including both governmental and non-governmental programmes)
- Quality assurance in patient care services
- Modes of health and vision care delivery Solo and group practice modes Multidisciplinary, interdisciplinary and institutional practice modes Optometry's role as a primary care profession

## **REFERENCE BOOKS:**

1. Park's Textbook of Preventive and Social Medicine. 23rd Edition.
2. Oxford Text Book of Public Health (5th Edition), Roger Detels, Mary Ann Lansang, Robert Beaglehole and Martin Gulliford



<b>U20OPTT33</b>	<b>SYSTEMIC &amp; OCULAR DISEASES</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **SYSTEMIC DISEASES**

(Theory: 30, Practical: 20 Hrs)

#### **EYELIDS:**

- Eyelid anatomy, Congenital and developmental anomalies of the eyelids
- Blepharospasm
- Ectropion, Entropion, Trichiasis and symblepharon
- Eyelid inflammations ,Eyelid tumours,
- Ptosis, Eyelid retraction,, Eyelid trauma

#### **LACRIMAL SYSTEM:**

- Lacrimal system, Lacrimal pump, Methods of lacrimal evaluation
- Congenital and development anomalies of the lacrimal system
- Lacrimal obstruction ,Lacrimal sac tumors ,Lacrimal trauma

#### **SCLERA**

- Episclera, Ectasia and staphyloma, Scleritis, episcleritis

#### **ORBIT:**

- Orbital anatomy, Incidence of orbital abnormalities, Methods of orbital examination
- Congenital and developmental anomalies of the orbit
- Orbital tumours, Orbital inflammations
- Sinus disorders affecting the orbit, Orbital trauma

#### **CONJUNCTIVA AND CORNEA INFLAMMATION:**

- Therapeutic principles, Specific inflammatory diseases
- Tumours of epithelial origin, Glandular and adnexal tumours of neuro ectodermal origin
- Vascular tumours, Xanthomatous lesions, Inflammatory lesions
- Metastatic tumours, Degenerations and dystrophies
- Definitions – Degenerations & Dystrophies

#### **MISCELLANEOUS CONDITIONS :**

- Keratoconjunctivitis, Sicca (KSicca) Tear function tests,
- Stevens – Johnson syndrome ,Ocular Rosacea Atopic eye disorders
- Benign mucosal pemphigoid (BMP) – ocular pemphigoid, Vitamin A deficiency,
- Metabolic diseases associated with corneal changes



**IRIS, CILIARY BODY AND PUPIL:**

- Congenital anomalies
- Primary and secondary disease of iris and ciliary body Tumors
- Anomalies of papillary reactions

**CHOROID:**

- Congenital anomalies of the choroids
- Diseases of the choroid Tumours

**REFERENCE BOOKS:**

1. Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2<sup>nd</sup> Ed., 1989
2. Basic and clinical science course – American Academy of Ophthalmology, 2004-2005
3. Principles and Practice of Ophthalmology
4. Parson's Diseases of the eye – Radhika Tandon, 22<sup>nd</sup> edition, Elsevier, 2014

**OCULAR DISEASES**

(Theory: 30 hours, Practical: 20 Hrs)

**VITREOUS:**

- Developmental abnormalities , Hereditary hyaloidoretinopathies, Juvenile retinoschisis
- Asteroid hyalosis, Cholesterolosis, Vitreous haemorrhage, Blunt trauma
- vitreous Inflammation, and the vitreous Parasitic infestations Pigment granules in the vitreous, complications in cataract surgery

**RETINA:**

- Retinal vascular diseases, Diseases of the choroidal vasculature, Bruch's membrane
- Retinal pigment epithelium (RPE) Retinal tumors, Retinoblastoma.
- Phakomatoses, Retinal vascular anomalies, Retinal and optic nerve head astrocytomas
- Lymphoid tumors, Tumors of the retinal pigment epithelium, Other retinal disorders
- Retinal inflammations, Metabolic diseases affecting the retina
- Miscellaneous disorders, Electromagnetic radiation effects on the retina
- Retinal physiology and psychophysics, Hereditary macular disorders (including albinism), Peripheral retinal degenerations, Retinal holes and detachments
- Intraocular foreign bodies, Photocoagulation

**GLAUCOMA:**

- Introduction to glaucoma – Epidemiology-Heridity
- Definition & classification of Glaucoma, Intra Ocular pressure
- Aqueous humor dynamics, clinical Evaluation-History
- General examination-Gonioscopy-Optic nerve head analysis-Visual fields
- Childhood Glaucoma



**Open angle glaucoma:**

- The glaucoma suspect
- Open angle glaucoma without elevated IOP
- Primary open angle glaucoma -Secondary open angle glaucoma -Angle closure glaucoma-Primary angle closure glaucoma-Secondary angle closure glaucoma
- Medical management of glaucoma - Surgery therapy for glaucoma
- Newer advances in the management of glaucoma

**NEURO – OPHTHALMOLOGY:**

- Neuro-ophthalmic examination, History, Visual function testing, Technique of papillary examination, Ocular motility, Checklist for testing Visual sensory system, The retina, The optic disc, The optic nerve The optic chiasm The optic tracts, The lateral geniculate body, The optic radiations, The visual cortex, The visual field, The blood supply of the anterior and posterior visual systems, Disorders of visual integration, Ocular motor system, Supranuclear control of eye movements - Saccadic system - Clinical disorders of the saccadic system - Gaze palsies - Progressive supra nuclear palsy - Parkinson's disease - Ocular motor apraxia-Ocular oscillation - Smooth pursuit system and disorders, Vergence system, Cerebellar system, Non-visual reflex system, Position maintenance system, Nystagmus, Ocular motor nerves and medial longitudinal fasciculus, The facial nerve Pain and sensation from the eye, Autonomic nervous system, Selected systemic disorders with neuro-ophthalmologic signs

**LENS:**

- Anatomy and pathophysiology, Normal anatomy and aging process
- Developmental defects, Acquired lenticular defects

**TRAUMA:**

- Anterior segment trauma, Posterior segment trauma

Blindness– definitions Causes

Social implications

Rationale in therapy, Drug induced ocular diseases

**REFERENCE BOOKS:**

1. Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2<sup>nd</sup> Ed., 1989
2. Basic and clinical science course – American Academy of Ophthalmology, 2004-2005
3. Principles and Practice of Ophthalmology
4. Parson's Diseases of the eye – Radhika Tandon, 22<sup>nd</sup> edition, Elsevier, 2014

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**ORTHOPTICS**

<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>60</b>	<b>40</b>	<b>100</b>

## **ORTHOPTICS**

(Theory: 60 hours, Practicals: 40 Hrs)

- Binocular Vision and Space perception Relative subjective visual direction. Retinomotor value Grades of BSV SMP and Cyclopean Eye Correspondence, Fusion, Diplopia, Retinal rivalry, Horopter, Physiological Diplopia and Suppression Stereopsis, Panum's area, BSV. Stereopsis and monocular clues -significance. Egocentric location, clinical applications, and Theories of Binocular vision. Anatomy of Extra Ocular Muscles, Rectii and Obliques, LPS, Innervation & Blood Supply.

### **PHYSIOLOGY OF OCULAR MOVEMENTS:**

- Center of rotation, Axes of Fick. Action of individual muscle.
- Laws of ocular motility Donder's and Listing's law
- Sherrington's law, Hering's law
- Uniocular & Binocular movements - fixation, saccadic & pursuits.
- Version & Vergence. Fixation & field of fixation

### **NEAR VISION COMPLEX, ACCOMMODATION:**

- Definition and mechanism (process).
- Methods of measurement.
- Stimulus and innervation.
- Types of accommodation.
- Anomalies of accommodation – etiology and management.
- Convergence: Definition and mechanism.
- Methods of measurement.
- Types and components of convergence -Tonic, accommodative, fusional, proximal. Anomalies of Convergence – etiology and management.
- Sensory adaptations Confusion

### **SUPPRESSION INVESTIGATIONS:**

- Management Blind spot syndrome
- Abnormal Retinal Correspondence
- Investigation and management Blind spot syndrome
- Eccentric Fixation Investigation and management
- Amblyopia Classification-etiology Investigation Management
- Neuro-muscular anomalies Classification and etiological factors
- History – recording and significance.
- Convergent strabismus Accommodative



**CONVERGENT SQUINT:**

- Classification, Investigation and Management
- Non accommodative Convergent squint
- Classification Investigation and Management

Divergent Strabismus, Classification A & V, phenomenon Investigation and Management Vertical strabismus Classification, Investigation and Management, Paralytic Strabismus, Acquired and Congenital, Clinical Characteristics, Distinction from comitant and restrictive squint, Investigations, History and symptoms Head Posture, Diplopia, Charting Hess chart, PBCTN indirections, Binocular field of vision, Amblyopia and Treatment of Amblyopia, Nystagmus, Non-surgical Management of Squint, Restrictive Strabismus, Features, Musculo-fascial anomalies, Duane's Retraction syndrome, Clinical features and management, Brown's Superior oblique sheath syndrome, Strabismus fixus, Congenital muscle fibrosis, Surgical management

**PRACTICAL:**

- History taking & general observation
- Ocular motility
- NPA measurement (all techniques)
- Amplitude of accommodation calculation
- Relative accommodation (NRA/PRA)
- Accommodative facility
- Dynamic retinoscopy (Nott & MEM methods)
- NPC measurement (Subjective & Objective) -All techniques
- Hirschberg Test (Distance &Near)
- Cover tests (Distance &Near)
- Maddox rod test (Distance &Near)
- Prism bar cover test
- Step vergence ranges (Distance &Near)
- Vergence facility
- AC/A ratio
- Stereoacuity
- Tests for diplopia
- Tests for suppression
- Tests for ARC
- Diplopia charting
- Vision therapy procedures for accommodation, vergence problems and amblyopia
- Horopter
- Physiological diplopia

**REFERENCE BOOKS:**

1. Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
2. Gunter K. Von Noorden: Burian- Von Noorden's Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company
3. Basic Science, A.A.O (section-6) Pediatric Ophthalmology and Strabismus 1992-1993
4. Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric



**CLINICS AND SPECIAL CLINICS I & II**

- Case sheet
- History taking
- Lensometry
- Visual acuity
- Tests for phorias and tropias
- External examination
- Slit lamp examination
- Drugs and method of application
- Do's and don'ts – papillary dilatation
- Direct Ophthalmoscopy
- Indirect Ophthalmoscopy
- Instrumentation
- Patients selection
- Keratometry reading
- Refraction
- Fluorescent pattern
- Over refraction
- Fitting of hard lenses
- Rigid gas permeable lenses and soft lenses in refractive errors and in specialized condition

The students are made to observe the interneers initially, then gradually they are encouraged to work up a patient, and perform various examination techniques

(NOTE: The portion for clinics I and II are the same)



<b>U20CTAT31</b>	<b>BIostatistics AND ETHICS</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>30</b>	<b>-</b>	<b>30</b>

**BIostatistics (15Hrs)**

- Introduction to Statistics
- Scales of Measurement
- Collection and Presentation of data
- Measures of Central tendency
- Measures of Variation
- Probability
- Binomial and Normal distribution
- Sampling Methods
- Sample size determination
- Correlation and Regression
- Statistical Significance
- Non-Parametric tests
- Health Statistics including hospital statistics

**REFERENCE BOOKS:**

1. KR Sundaram, SN Dwivedi and V Sreenivas (2010): Medical Statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi, India.
2. A Indrayan (2008): Basic Methods of Medical Research, Second edition, AITBS Publishers, India.
3. NSN Rao and NS Murthy (2008): Applied Statistics in Health Sciences, First Edition, JAYPEE brothers medical publishers (P) Ltd, India.

**MEDICAL ETHICS (15Hrs)**

1. Medical ethics - Definition - Goal -Scope
2. Code of conduct - Introduction–Basic principles of medical ethics–Confidentiality
3. Malpractice and negligence
4. Rational and irrational drug therapy
5. Autonomy and informed consent Rights of patients
6. Care of the terminally ill-Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medical legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records- other various aspects.

**REFERENCE BOOKS:**

1. Medical Ethics Manual-The Pocket Manual
2. The Medical Ethics Today The BMA's Handbook of Ethics and Law –The British Medical Association