



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)
Puducherry – 605 107

2nd - Board of Studies Meeting
ALLIED HEALTH SCIENCES

for the Programmes

1. B.Sc., Medical Laboratory Technology
2. B.Sc., Optometry
3. B.Sc., Radiography & Imaging Technology
4. B.Sc., Cardiac Lab Technology
5. Diploma in Radiography & Imaging Technology
6. Diploma in Medical Laboratory Technology
7. Certificate course in CSSD

Venue

College Council Hall
Sri Manakula Vinayagar Medical College and Hospital
Kalithirthalkuppam, Puducherry – 605 107

Date & Time

25.03.2021 & 09.30 AM

AGENDA OF THE MEETING

1. To approve the revised curriculum for all the programmes
 - Distribution of Lecture / Practical hours
 - Distribution of marks for CAT & EYE
2. To discuss about the Evaluation Systems
 - Question paper pattern
 - Classification of Degree
3. To approve the criteria for "Pass" in a subject
4. To approve the dates of Model & EYE Examination
5. Any other with the approval of the Chairman of the Programme


MINUTES OF THE MEETING

Dr.R.Gopal, Dean School of AHS, initiated the meeting by a warm welcome and introduced the External Member the Internal and Co-opted Members and thanked them for accepting the invitation of 2nd BOS meeting. The Chairman proceeded with the presentation to deliberate on agenda items.

Item 1:	The Meeting Confirmed the Minutes of the First BOS Meeting with following changes: Revised curriculum for all the courses : The Chairman & Members of the BOS of the respective Programmes approved the changes made in the Curriculum including teaching hours and distribution of the Marks for CAT and EYE as enclosed(Annexure –I) The minimum marks for pass in Ancillary Subjects for which only CAT Examination will be held viz English, Computer Science, Environmental Science & Community Medicine, Biostatistics & Ethics, Pharmacology is 50% (Annexure-I)
Item 2:	The BOS members have approved the Evaluation Systems and recommended to Academic Council
Item 3:	The members have approved the minimum pass percentage as 40% for Theory & Practical separately and the aggregate of both Theory & Practical is 50 %.
Item 4:	Dates of Model Examination and EYE Examination The Members have approved the tentative dates of Model and EYE Examination fixed for the Month of July and August 2021 respectively (Annexure – II)

Item 5:	The Members have approved the lateral entry of Diploma holders to the Second Year of the B.Sc Programme, subject to fulfillment of the General Rules for Admission
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meeting for 1st, 2nd and 3rd year and syllabi approval was concluded at 1.00 pm with vote of thanks by R. Gopal, Dean School of AHS Sri Manakula Vinayagar Engineering College.


DEAN - AHS



Sri Manakula Vinayagar Engineering College
(An Autonomous Institution), Puducherry
School of Allied health science

Minutes of the Meeting of Board of Studies


Course: B. Sc.Optomety

Date: 25.03.2021

Time: 10:30am to 11:30am


The Second meeting of the B.O.S was held on 25/03/2021 at the Academic council hall of SMVEC. The meeting was attended by internal members in person and externals in person or by Google meet. The following persons participated in the meeting.

Sl. No.	Name and designation	Responsibility in BOS	Signature
1	Dr. Nallamuthu Professor & HOD of Ophthalmology (Sri Manakula Vinayagar Medical College and Hospital) 9843890074 drpnallamuthu@gmail.com	Chairman	
2	Dr. Renuga Devi Assistant Professor of Ophthalmology (Sri Manakula Vinayagar Medical College and Hospital) 9894995351 drmku2009@gmail.com	Member	
3	Dr. Sripal Assistant professor of Ophthalmology (Sri Manakula Vinayagar Medical College and Hospital) 9597350850 sripaldr@gmail.com	Member	
4	Dr. Loganathan, Professor (Sri Venkateshwaraa Medical College Hospital & Research Centre)	Member	
5	Dr. Bhagwati Wadwekar Associate Professor of Ophthalmology Pondicherry institute of Medical Sciences pondicherry	Member (External)	
6	Dr. Prince Associate Professor of Microbiology (Mother Teresa Post Graduate and research Institute of Health Sciences, Puducherry) PH: 9345413279	Member (External)	

9	Ms. Ramya.R, Tutor, Department of Ophthalmology, SMVEC 9629646435 ramyachithra1997@gmail.com	Member	
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Chairman




Director cum Principal

Dean Academics
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SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi & Accredited by NAAC with "A" Grade)
Madagadipet, Puducherry - 605 107



SCHOOL OF ALLIED HEALTH SCIENCES

B.Sc.IN OPTOMETRY

CURRICULLUM & SYLLABI

(R-2020)

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:

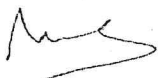
- Accomplishes this mission through collaboration with educators, administrators, , students, industry, healthcare organizations, and other stakeholders through its education, research, advocacy and development activities.

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 1ST 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
TOTAL	350	550	900

DISTRIBUTION OF MARKS FOR 1ST 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
	TOTAL	-	-	-	-	-	-	500	200	-	-	-	-	400	170	900	450

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

***CAT Practicals (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 2ND 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
TOTAL	270	1320	1590

DISTRIBUTION OF MARKS FOR 2ND 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
TOTAL								450	195					180	72	630	315

*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 3RD 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
TOTAL	270	1360	1630

DISTRIBUTION OF MARKS FOR 3RD 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
U20OPTT31	LOW VISION AID 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
TOTAL		-	-	-	-	-	-	450	185	-	-	-	-	240	94	690	345

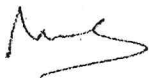
*EYE Examination, **CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

***CAT Practicals (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%.



I-YEAR SYLLABUS

U20CTAT11	ANATOMY	L	P	Hrs
		60	40	100

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



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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. Micro anatomy 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 inguinal canal
 - Rectus sheath and their importance



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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 bloodsupply
2. Ureter & urinarybladder
 - Location
 - Parts
 - Relations and bloodsupply
3. Male reproductivesystem
 - Testis
 - Spermatic cord and itscoverings
4. Female reproductivesystem
 - Ovary
 - Uterus – parts andsupports
5. Accessory organs of reproduction
 - Prostategland
 - Mammarygland

ENDOCRINE SYSTEM

1. List the endocrine glands and theirlocation
2. Thyroid and parathyroidglands
 - Location
 - Relations
 - Blood supply
 - Functions & clinical importance
3. Pituitarygland
 - Location



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- 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 edition - Ross & Wilson
3. Vishram Singh, "Clinical and Surgical Anatomy", Elsevier Health Sciences, 2nd Edition, 2019.
4. Sampath Madhyastha, "Manipal Manual of Anatomy For Allied Health Sciences", CBS Publishers & Distributors, 3rd Edition, 2020.
5. Richard Drake A. Wayne Vogl Adam Mitchell, "Gray's Anatomy for Students – Companion Work Book", Churchill Livingstone Publications, 4th Edition, 2019.
6. A K Datta, "Principles Of General Anatomy", Current Books International , 8th Edition, 2018.
7. Nafis Ahmad Faruqi, "Human Osteology", CBS Publishers & Distributors, 3rd Edition, 2018.
8. Inderbir Singh, "Human Histology", Jaypee Publications, 9th 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 givenspecimen.
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



U20CTAT12

PHYSIOLOGY

L	P	Hrs
60	40	100

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:

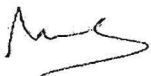
- Respiratory movements.
- Definitions and Normal values of Lung volumes and Lung capacities.

EXCRETORY SYSTEM

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

REPRODUCTIVE SYSTEM

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



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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:

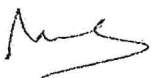
1. Raj Kapoor, " Physiology Practical Manual for Allied Health Sciences", CBS Publishers and Distributors Pvt Ltd, 3RD Edition.
2. Marya, "Medical Physiology", CBS Publishers and Distributors Pvt Ltd, 4th Edition.
3. CL Ghai, "Text Book of Practical Physiology", Jaypee Brothers Medical Publishers, 9th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



U20CTAT13

BIOCHEMISTRY

L	P	Hrs
60	40	100

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

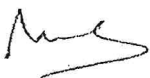
Liver function Test, Renal Function Test, Thyroid Function Test

ACID BASE BALANCE AND IMBALANCE

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

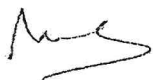
SAMPLE COLLECTION AND TRANSPORT

Types of samples, Anticoagulants, Phlebotomy, Sample Transport



REFERENCE BOOKS:

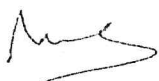
1. Allan Gaw, "Clinical Biochemistry – An Illustrated Colour Text", Churchill Livingstone, 3rd edition
2. Nanda Maheshwari, "Clinical Biochemistry ", Jaypee brothers medical publishers, 2nd edition
3. Victor Rodwell, "Harper's Illustrated Biochemistry", McGraw-Hill Education, 31st edition
4. DmVasudevan,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



U20CTAT14	MICROBIOLOGY	L	P	Hrs
		60	40	100

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 for infectant.
- **Culture media:** Introduction, basal media, synthetic media, special media with emphasis on their uses.
- **Culture methods:** Aerobic and Anaerobic culture methods.

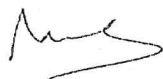
IMMUNOLOGY

- Infection - types, Route, source of infections, vector, factors affecting virulence, Exotoxins endotoxins
- Antigen – types factors affecting antigenicity
- 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 phenomno, 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



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

VIROLOGY

- Introduction and General properties of viruses morphology and general characters susceptibility to physical chemical agents , viral heamagglutations, 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

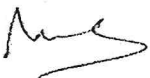
Introduction – Morphology, General characteristics, classifications, outline of lab diagnosis, Morphology Pathology, clinical feature, lab diagnosis, treatment prevention of the following pathogens

- Candida
- Cryptococcus
- Aspergilluspp

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, 3rd Edition.
2. Thao Doan, "Lippincotts Illustrated Reviews Immunology", Lippincotts Williams & Wilkins, 2nd Edition.
3. ApurbaSastry, "Textbook Of Essentials Of Practical Microbiology", Jaypee Brothers,
4. 1st Edition.
5. Baveja, "Textbook Of Practical Microbiology, Arya Publications", 4thEdition.
6. JayaramPanikar, " Textbook Of Microbiology", Orient Black swan Pvt Limited, 9th Edition.
7. Baveja, "Textbook Of Microbiology", Arya Publications, 6thEdition.
8. Baveja, "Textbook Of Parasitology" , Arya Publications, 4thEdition



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

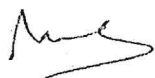
- Chromosome aberrations
- congenital & developmental anomalies

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

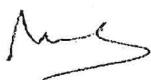
- Osteomyelitis
- Arthritis
- Osteoporosis
- Bone tumours



Curriculum and Syllabi R-2020

REFERENCE BOOKS:

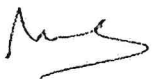
1. NayakRamadas, "Textbook Of Pathology For Allied Health Sciences" ,Jaypee Brothers 1st Edition.
2. Nanda Maheshwari, "Clinical Pathology/Hematology and Blood Banking" (For DMLT Students), Jaypee Brothers, 3rd Edition.
3. NayakRamadas, "Histopathology Techniques & Its Management", Jaypee Brothers, 1st Edition.
4. RamnikSood, "Concise Book of Medical Laboratory Technology Methods and Interpretations", Jaypee Brothers, 2nd Edition.
5. Dacie&Lewis, "Practical Hematology", Elsevier Health – Uk, 11th Edition.
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



U20CTAT16	ENGLISH	L	P	Hrs
		25	25	50

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

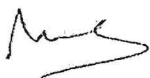
- How to construct correctly Formal language, Address, Salutation
- Body and Conclusion

REPORT WRITING

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

PRACTICAL

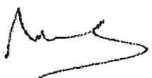
- The clinical experience in the wards and bedside nursing will provide opportunity for students to fulfill the objectives of learning language
- Assignment on writing and conversation through participation in discussion debates seminars and symposia. The students will gain further skills in task oriented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



Curriculum and Syllabi R-2020

REFERENCE BOOKS:

1. SelvaRose. 1997, Career English for Nurses. Published by: Orient BlackswanLtd
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 MaituietA.V. 1987, A Practical English Grammar, Delhi: Oxford UniversityPress.
5. Gimson A.C.1989, An Introduction to pronunciation ofEnglish. Hodder Arnold; 4th Revised edition (1 May1989).
6. O'Connor J.D, 1986. Better English pronunciation.Cambridge: UniversityPress
7. By water F.V.A. 1982, Proficiency Course in English. London: 1- lodder andStronglton.
8. Roget S.P. 1960, Thesaurus of English Words & Phrases, London: Lowe &Brydone Ltd.1960.



U20CTAT17

COMPUTER SCIENCE

L	P	Hrs
25	25	50

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

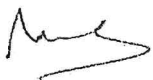
- Sending messages – Attaching files in E-mailID
- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word
- Create emailmergedocument using MS-wordtopreparegreetingsfor10 friends
- Preparing a Slides how with transition, animation and sound effect using MS-PowerPoint
- Customizing the slides how and inserting pictures and tables in the slides using MS- PowerPoint
- 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-mailID



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 DeepakKalkadia, Francesco DiMambro, Prentice hall publisher, May 25,2007
4. Operation system concepts (8th edition) by AbrahamSilberschatz, 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

U20OPTT21	OPTOMETRIC OPTICS I & II	L	P	Hrs
		60	40	100

OPTOMETRIC OPTICS I

SPECTACLE LENSES

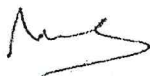
- Introduction To Spectacle Lenses
- Forms Of Lenses - Cylindrical And Sphero Cylindrical Lenses
- Properties Of Crossed Cylinders
- Toric Lenses
- Toric Transportation
- Astigmatic Lenses
- Axis Direction Of Astigmatic Lenses
- Obliquely Crossed Cylinders
- Sag Formula
- Miscellaneous Spectacle Lenses
- 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



U20OPTT22

**DISPENSING OPTOMETRY & OPTOMETRIC
INSTRUMENTS**

L	P	Hrs
60	40	100

DISPENSING OPTOMETRY

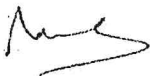
- Clinical experiences in verification and dispensing of ophthalmic materials outlined in Ophthalmic Optics
- Course and Dispensing Optics
- Special practical instructions in centering, marking and mounting the lenses of all designs, types, shapes and sizes in accordance with frame and facial measurements
- 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, Pantoscopic 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:

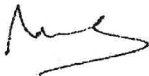
1. The fine art of prescribing glasses, Benjamin Milder, ButterworthHeinemann,
2. Systems of ophthalmic dispensing, Brook & Borish, ButterworthHeinemann
3. Spectacle frame dispensing: H Obstfeld: ButterworthHeinemann
4. Clinical Optics, Troy Fannin, Theodore Grosvenor, ButterworthHeinemann



Curriculum and Syllabi R-2020

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
- Gold mann 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. AzarMD
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, Mosby1985



	L	P	Hrs
U20OPTT23			
VISUAL OPTICS I & II	60	40	100

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 ophthalmometry
- Axial and axis of the eye Measurement of the optical constants of the eye
- Corneal curvature and thickness
- Keratometry Curvature of the lens and ophthalmometry 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

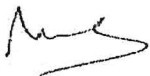
- Principles and methods
- Speed of reflex and optimum condition
- Retinoscopy – dynamic/static Review of objective refractive methods Review of subjective refractive methods Cross cylinder method for astigmatism Astigmatic Fan test Difficulties in objective tests and their avoidance Transposition of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

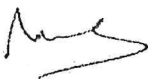


Curriculum and Syllabi R-2020

- 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 cycloplegic retinoscopic 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
- Perotinterferometer

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

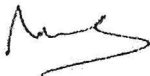
- Applied Aspects
 - Glare effect
 - light reduction effect
 - Photo electric effect
 - Raman Effect
 - LASER Optical instruments Spectrometer
- Simple and compound microscope Telescope Resolving power of optical instruments Resolving power of the eye Magnifying power of simple and compound microscope, 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

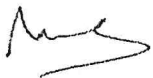


GEOMETRIC OPTICS I

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&dioptricpower
- 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
- Dioptic power of equivalent lenses.
- Application – to calculate to the equivalent dioptric power of thick meniscus lens
- Plano convex vertex powers
- Position of principal planes
- Dioptic 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



Curriculum and Syllabi R-2020

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

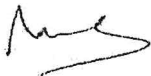
PRACTICALS

- 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-MichaelP.Kealing
4. Aberrations of Opticalsystems-W.T.Welford
5. Introduction to Geometrical optics-MiltonKatz



Curriculum and Syllabi R-2020

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 Renu Jogi published by Jaypee



U20CTAT21

PHARMACOLOGY

L	P	Hrs
30	-	30

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



	L	P	Hrs
U20CTAT22	30	-	30
ENVIRONMENTAL SCIENCE & COMMUNITY MEDICINE			

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:

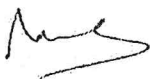
1. Text book of Environmental studies for Under Graduate courses by ErachBarucha

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 – 23rd 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

U20OPTT31	LOW VISION AIDS & OCCUPATIONAL OPTOMETRY	L	P	Hrs
		60	40	100

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. BrilliantOD
2. Low Vision Manual - Jackson andWolffsohn
3. The Art and Practice of Low Vision (2nd Edition) - P. D. Freeman and R. T.Jose
4. Low Vision Principles & Practice - CDickinson



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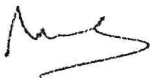
OCCUPATIONAL OPTOMETRY

(Theory: 30 hours, Practicals:20Hrs)

- 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. 5th Edition,2002
3. John Ridley & John Channing. Safety at work. 5th Edition 1999, reprinted2000,2001
4. Stephen Konz, Steven Johnson. Work Design-Industrial Ergonomics2000
5. Salvatore R. Dinardi. The Occupational Environment – Its Evaluation and Control1997
6. Linda Rosenstock& Mark R.Cullen. Textbook of Clinical Occupational and Environmental Medicine,1994

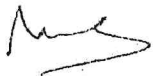


U20OPTT32	CONTACT LENS & COMMUNITY OPTOMETRY	L	P	Hrs
		60	40	100

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



Curriculum and Syllabi R-2020

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, 3rd Edition, 1981, Illinois, USA
5. 1981, Illinois, USA
6. Ruben M Guillon: Contact lens practice, 994, 1st Edition



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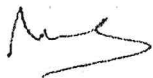
COMMUNITY OPTOMETRY

(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



U20OPTT33	SYSTEMIC & OCULAR DISEASES	L	P	Hrs
		60	40	100

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:

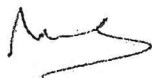
- Orbital anatomy, Incidence of orbital abnormalities, Methods of orbital examination
- Congenital and developmental anomalies of the orbit
- Orbital tumours, Orbital inflammations
- Sinus disorders affecting the orbit, Orbital trauma

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



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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, 2nd 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, 22nd 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



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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

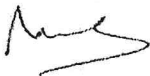
Blindness– definitions Causes

Social implications

Rationale in therapy, Drug induced ocular diseases

REFERENCE BOOKS:

1. Jack J. Kanski: Clinical Ophthalmology, Butterworths, 2nd 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, 22nd edition, Elsevier, 2014



U20OPTT34	ORTHOPTICS	L	P	Hrs
		60	40	100

ORTHOPTICS

(Theory: 60 hours, Practicals: 40 Hrs)

- Binocular Vision and Space perception Relative subjective visual direction. Retinomotorvalue 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:

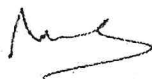
- Center of rotation, Axes of Fick. Action of individual muscle.
- Laws of ocular motility Donder's and Listing's law
- Sherrington's law, Hering's law
- Uniocular& Binocular movements - fixation, saccadic & pursuits.
- Version & Vergence. Fixation& field of fixation

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



Curriculum and Syllabi R-2020

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

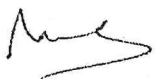


CLINICS AND SPECIAL CLINICS I & II

- 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)



	L	P	Hrs
U20CTAT31			
BIOSTATISTICS AND ETHICS			
	30	-	30

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. Alndrayan (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

