

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 CARDIAC LAB TECHNOLOGY

VISION AND MISSION

VISION

To advance human health through excellence in medical education, delivering patient centered services transformative research technologically advanced medical education, and exceptional clinical and preventive care, leading to healthier communities.

MISSION

M1: knowledge sharing:

- To impart basic, theoretical, practical and professional knowledge of high quality for overall holistic growth of every student.

M2: Collaborative learning:

- To develop innovative educational activities and participate in public health reforms through training, research and intervention in the field of laboratory sciences ,medicine and education

M3: Career Development:

- Prepare for satisfying employment, and develop successful lifelong career plans in an evolving global world of work.

M4: Consistent Improvement:

- Strive for excellence in the scientific, professional and humanistic aspects of their chosen discipline.



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 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 2ND YEAR COURSES

Course	Lecture	Practicals	Total
BASIC ECHOCARDIOGRAPHY CLINICAL FEATURES AND TREATMENT RELATED CARDIAC TECHNOLOGY AND BASIC LIFE SUPPORT	60	40	100
ELECTRO CARDIOGRAPHY (ECG),TMT& HOLTER	60	40	100
MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY	30	-	30
PHARMACOLOGY	30	-	30
ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE	30	-	30
CLINICAL POSTING	-	1200	1200
TOTAL	210	1280	1520

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
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20CLTT21	BASIC ECHOCARDIOGRAHY CLINICAL FEATURES AND TREATMENT RELATED CARDIAC TECHNOLOGY AND BASIC LIFE SUPPORT	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CLTT22	ELECTRO CARDIOGRAPHY (ECG),TMT& HOLTER	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CLTT23	MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY	-	-	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		-	-	-	-	-	-	350	155	-	-	-	-	120	48	470	235

*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
ADVANCED ECHO CARDIOGRAPHY	60	40	100
CARDIAC CATHETERIZATION	60	40	100
BIostatISTICS AND ETHICS	30	-	30
CLINICAL POSTING	-	1200	1200
TOTAL	150	1280	1430

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
U20CLTT31	ADVANCED ECHO CARDIOGRAPHY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CLTT32	CARDIAC CATHETERIZATION	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		-	-	-	-	-	-	250	105	-	-	-	-	120	48	370	185

*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%.

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. 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



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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 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



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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, 11th 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 Detta, "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 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



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



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 CT
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 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 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
- 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

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. Apurba Sastry, "Textbook Of Essentials Of Practical Microbiology", Jaypee Brothers,
4. 1st Edition.
5. Baveja, "Textbook Of Practical Microbiology, Arya Publications", 4th Edition.
6. JayaramPanikar, " Textbook Of Microbiology", Orient Black swan Pvt Limited, 9th Edition.
7. Baveja, "Textbook Of Microbiology", Arya Publications, 6th Edition.
8. Baveja, "Textbook Of Parasitology" , Arya Publications, 4th 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



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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



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



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REFERENCE BOOKS:

1. Nayak Ramadas, "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. Nayak Ramadas, "Histopathology Techniques & Its Management", Jaypee Brothers, 1st Edition.
4. Ramnik Sood, "Concise Book of Medical Laboratory Technology Methods and Interpretations", Jaypee Brothers, 2nd 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



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.



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 Stronglton.
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-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-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-mail ID



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 (8th 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

U20CLTT21	BASIC ECHOCARDIOGRAPHY CLINICAL FEATURES & TREATMENT RELATED CARDIAC TECHNOLOGY & BASIC LIFE SUPPORT	L 60	P 40	Hrs 100
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REVIEW OF ANATOMY AND PHYSIOLOGY OF BLOOD AND CARDIO VASCULAR SYSTEM

- Assessment-History and Physical assessment
- Etiology, Patho physiology, clinical manifestations, diagnosis, treatment modalities of :
 - Vascular system
 - Hypertension, Hypotension
 - Atherosclerosis
 - Reynaud's disease
 - Aneurism and approaches to peripheral vascular

DISORDERS-HEART

- Coronary artery diseases
- Ischemic Heart Disease
- Atherosclerosis
- Angina pectoris
- Myocardial infarction
- Valvular disorders of the heart
 - Congenital and acquired - Rheumatic Heart diseases Infective Endocarditic, congenital heart Diseases
- Endocarditis, Pericarditis, Myocarditis
- Cardio Myopathies
- Cardiac dysrhythmias, Heart Block
- Congestive cardiac failure, Cor-pulmonale, pulmonary edema, cardiogenic shock, cardiac tamponade
- Cardiac emergencies and arrest
- Cardio Pulmonary Resuscitation(CPR)
- Cardiac dysrhythmia and Heart Block

Drugs used in treatment of Blood and cardio vascular disorders

Whole Blooded Plasma and PCD – Pathology and illness – Approach to Pediatric Patients

- Airway Management
- Anaphylaxis
- Approach to Shock
- Initial Management of Shock
- Approach to Syncope
- Approach to Restless Patient
- Approach to Pediatric Patients
- Safe transfer of patients to definitive care areas
- Approach to Trauma Patients



REFERENCE BOOKS:

1. Textbook of Clinical Echocardiography –Catherine M.Otto ,published by Elsevier
2. Feigenbaum's Echocardiography –William F.Armstrong , Thomas Ryan ,published by Wolters Kluwer
3. Comprehensive Textbook of Echocardiography –Navin C Nanda ,published by Jaypee Brothers
4. Echo Made Easy –Atul Luthra ,published by Jaypee Brothers
5. Basic Life Support-Provider Manual



U20CLTT22	ELECTRO CARDIOGRAPHY (ECG),TMT & HOLTER	L	P	Hrs
		60	40	100

FUNDAMENTAL PRINCIPLES OF ELECTROCARDIOGRAPHY:

- Cardiac electrical field generation during activation Cardiac wave fronts
- Cardiac electrical field generation during ventricular recovery
- Electrocardiographic lead systems - Standard limb leads
- Precordial leads and the Wisdom central terminal Augmented limb leads
- The hexa axial reference frame and electrical axis Recording adult and pediatric ECGs
- The normal electrocardiogram Atrial activation
- The normal P wave Atrial repolarization
- Atrio ventricular node conduction and the PR segment
- Ventricular activation and the QRS complex
- Ventricular recovery and ST-Wave
- U wave Normal variants
- Rate and rhythm

TREADMILL EXERCISE STRESS TESTING AND 24 HOUR AMBULATORY ECG (HOLTER) RECORDING:

- Exercise physiology
- Exercise protocols
- Lead systems
- Patient preparation
- ST segment displacement – types and measurement
- Non-electrocardiographic observations
- Exercise test indications, contra-indications and precautions
- Cardiac arrhythmias and conduction disturbances during stress testing Emergencies in the stress testing laboratory
- Principles of Holter Recording Connections of the Holter recorder
- Holter Analysis
- Guidelines for ambulatory electrocardiography

ECHOCARDIOGRAPHY:

- M- mode and 2D trans thoracic echo cardiography
- Views used in trans thoracic echo cardiography

DOPPLER ECHOCARDIOGRAPHY:

- Pulsed, continuous wave and colour Measurement of cardiac dimensions
- Evaluation of systolic and diastolic left ventricular function, Regional wall motion abnormalities
- Stroke volume and cardiac output assessment Trans valvular gradients
- Orifice area Continuity equation



ADVANCED ELECTRO CARDIOGRAPHY (ECG) THE ABNORMAL ELECTROCARDIOGRAM:

- Left atrial abnormality
- Right atrial abnormality

Left ventricular hypertrophy and enlargement Right ventricular hypertrophy and enlargement Intra ventricular conduction delays ,Left anterior fascicular block ,Left posterior fascicular block Left bundle branch block Right bundle branch block . Myocardial ischemia and infarction repolarization (ST-T wave) abnormalities ,QRS changes, Evolution of electrocardiographic changes, Localization of ischemia or infarction, Non-infarction Q waves Primary and secondary T wave change Electrolyte and metabolic ECG abnormalities Cardiac arrhythmias ,Ventricular premature beats Supra-ventricular tachycardias Atrial flutter/fibrillation ,Ventricular Tachycardia/Ventricular fibrillation Atrio Ventricular block, Prolonged PR interval Mobitz type 1 and 2 block complete heart block. Direct Current (DC), shock Defibrillator Monophasic and biphasic shock Technique of cardioversion, Indications for cardio version

REFERENCE BOOKS:

1. Feigenbaum's Echocardiography Eighth Edition Wolters Kluwer
2. Textbook of Clinical Echocardiography-Catherine M. Otto Sixth Edition Elsevier
3. Leo Schamrothan Introduction to Electrocardiology Eighth Edition Wiley
4. Marriott's Practical Electrocardiology –Illustrated Twelfth edition Wolters Kluwer



U20CLTT23	MEDICAL ELECTRONIC,BIOPHYSICS& COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY	L	P	Hrs
		30	-	30

INTRODUCTION:

- Introduction to medical physics
- Blood pressure recording
- Pressure transducers
- Defibrillators
- Cathode ray tubes and physiological monitors
- Impedence
- Plethysmography
- Pulse oximetry
- Medical ultrasound and Doppler
- Ionic currents and Electrocardiography
- Electrocardiographic processing and display system Radiation physics
- Techniques of monitoring
- Radiation exposure
- Measures to reduce radiation exposure
- Computer use in medical care and data entry

REFERENCE BOOKS:

1. Handbook of Biomedical Instrumentation-Khandpur R.S,published by TATA McGraw Hill
2. Biomedical instrument & Measurements –Cromwell, Leslie, published by Prentice hall, New Jersey



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



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

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 – 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 Sund



III-YEAR SYLLABUS

U20CLTT31	ADVANCED ECHO CARDIOGRAPHY	L	P	Hrs
		60	40	100

ECHOCARDIOGRAPHY IN VALVULAR HEART DISEASE:

- Mitral stenosis
- Mitral regurgitation
- Mitral valve prolapse
- Aortic stenosis
- Aortic regurgitation
- Infective endocarditis
- Prosthetic valve assessment
- Echocardiography in Cardiomyopathies
- Dilated Hypertrophic
- Restrictive Constrictive pericarditis
- Pericardial effusion and cardiac tamponade

ECHOCARDIOGRAPHIC DETECTION OF CONGENITAL HEART DISEASE

- Atrial septal defect
- Ventricular septal defect
- Patent ductus arteriosus
- Pulmonary stenosis
- Tetralogy of Fallot
- Coarctation of aorta
- Left atrial thrombus
- Left atrial myxoma
- Transesophageal echocardiography
- Stress Echo Cardiography and Contrast Echo Cardiography

REFERENCE BOOKS:

1. Textbook of Clinical Echocardiography –Catherine M.Otto, published by Elsevier
2. Feigenbaum's Echocardiography –William F.Armstrong, Thomas Ryan, published by Wolters Kluwer
3. Comprehensive Textbook of Echocardiography –Navin C Nanda, published by Jaypee Brothers
4. Echo Made Easy –Atul Luthra, published by Jaypee Brother



U20CLTT32	CARDIAC CATHETERIZATION	L	P	Hrs
		60	40	100

- Type of catheters
- Catheter cleaning and packing
- Techniques of sterilization-advantages and disadvantages of each method preparing up the cardiac catheterization laboratory for a diagnostic study Table movement
- Image intensifier movement, Image play back
- Intra cardiac pressures ,Pressure recording systems
- Fluid filled catheters versus catheter tipped manometers Artifacts, damping, ventricularization
- Pressure gradient recording – pullback, peak – to peak Cardiac output determination
- Thermo dilution method
- Oxygen dilution method
- Principles of oximetry
- Shunt detection and calculations.
- Coronary angiography
- Coronary angiographic catheters
- Use of the manifold
- Angiographic views in coronary angiography Laboratory preparation for coronary angiography
- Left Ventriculography – catheters, views, use of the injector
- Right heart catheterization and angiography
- Radiation protection
- Catheters used in Electrophysiology studies
- Connection of Catheters during in EP study
- Equipment used in Arrhythmia, Induction and Mapping
- Radio frequency ablation
- ECM
- Ventricular assist device
- Fundaments of pacemaker

CARDIAC CATHETERIZATION LABORATORY ADVANCE:

- (PTCA)
- Equipment and hardware used in PTCA
- Guiding catheters Aortic angiography – aortic root, arch, abdominal aorta
Peripheral angiography and carbondioxide angiography
- Catheterization and angiography in children with congenital heart disease
- Contrast agents
- Ionic and non-ionic
- Types of non-ionic nephropathy
- Measures to reduce incidence of contrast nephropathy
- Coronary angioplasty Guide wires
- Balloons Stents



Curriculum and Syllabi R-2020

- Setting up the laboratory for a PTCA case Management of complications:
- Slow flow/no flow Acute stent thrombosis
- Dissection Perforation
- Pediatric Interventions
- Aortic and pulmonary valvuloplasty Coarctation angioplasty and stenting Device closure of PDA,ASD,VSD
- Technique and devices used Sizing of devices Coil closure of PDAs

BALLOON MITRAL VALVULOPLASTY (BMV)

- Techniques and hardware used in BMV
- Setting up the laboratory for a BMV case
- Technique and equipment used for transseptal puncture
- Recording of transmitral pressure gradients Management of cardiac tamponade
Peripheral interventions
- Equipment and techniques used Endovascular exclusion of aneurysms
- Self-expanding stents, covered stents and cutting balloons

INTRA-AORTIC BALLOON PUMP (IABP)

- Theory of intra-aortic balloon counter pulsation
- Indications for IABP use
- Setting up the IABP system

THROMBOEMBOLIC DISEASE

- Indications and use of venacaval filters
- Techniques of thrombolysis
- drug and catheters used
- Thrombus aspirations systems – coronary, peripheral

CARDIAC PACING

- Temporary pacing – indications, technique
- Permanent pacing Indications
- Types of pacemakers and leads
- Setting up the laboratory for permanent pacing Pacemaker parameter, checking
- Follow-up of pacemaker patients

CARDIAC ELECTROPHYSIOLOGY

- Catheters used in electrophysiology studies
- Connection of catheters during an EP
- Study Equipment used in arrhythmia
- Induction and mapping
- Radio frequency ablation
- Image archival systems and compact disc (CD) writing



REFERENCE BOOKS:

1. The Interventional Cardiac Catheterization Handbook –Morton J.Kern, Paul Sorajja, Michael J.Lim published by Elsevier
2. Cardiac Catheterization in Congenital Heart Disease (Pediatric and Adult) – Charles E. Mullins published by Wiley
3. Grossman and Baim's Cardiac Catheterization ,Angiography and Intervention –Mauro Moscucci,published by Wolters Kluwer
4. The Cardiac Catheterization Handbook –Morton J.Kern, Paul Sorajja , Michael J.Lim ,published by Elsevier



U20CTAT31	BIOSTATISTICS AND ETHICS	L	P	Hrs
		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. 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