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 RADIOGRAPHY AND IMAGING TECHNOLOGY

VISION AND MISSION

VISION

To impart quality assurance in medical plethora by amalgamating teaching, research and technology through translucent system of good community.

MISSION

M1: knowledge sharing:

- To develop and transmit knowledge of diverse aspects of health care delivery and health research

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:

- Providing excellent educational programs for health sciences professions students

M4: Consistent Improvement:

- Continuously provide quality education, advance knowledge through scholarship and research that improves health and quality of life.

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			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Theory+ Practical	
																Max	Min
D20CTAT11	ANATOMY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT12	PHYSIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT13	BIO-CHEMISTRY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT14	MICROBIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT15	PATHOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT16	ENGLISH	-	-	-	-	-	-	-	-	-	-	50	25	50	25	50	25
D20CTAT17	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%.

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DISTRIBUTION OF TEACHING HOURS FOR 2ND YEAR COURSES

Course	Lecture	Practicals	Total
DIAGNOSTIC IMAGING TECHNIQUES & MODALITIES	60	40	100
RADIOGRAPHIC SPECIAL PROCEDURES AND PATIENT CARE	60	40	100
RADIOGRAPHIC POSITIONING AND TECHNIQUES	60	40	100
ETHICS	30	-	30
CLINICAL POSTING	-	1200	1200
Total	**210**	**1320**	**1530**

DISTRIBUTION OFMARKS FOR 2ND YEAR COURSES

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Theory+ Practical	
																Max	Min
D20RITT21	DIAGNOSTIC IMAGING TECHNIQUES & MODALITIES	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20RITT22	RADIOGRAPHIC SPECIAL PROCEDURES AND PATIENT CARE	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20RITT23	RADIOGRAPHIC POSITIONING AND TECHNIQUES	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
D20CTAT21	ETHICS	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
TOTAL		**-**	**-**	**-**	**-**	**-**	**-**	**350**	**145**	**-**	**-**	**-**	**-**	**180**	**72**	**530**	**265**

*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

		L	P	Hrs
D20CTAT11	**ANATOMY**	**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

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

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

- 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,11edition - 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 – Companian 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

D20CTAT12	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, 3RDEdition.
2. Marya, "Medical Physiology", CBS Publishers and Distributors Pvt Ltd, 4thEdition.
3. CL Ghai, "Text Book of Practical Physiology", Jaypee Brothers Medical Publishers, 9thEdition.
4. Vidya Rattan, "Hand Book of Human Physiology", Jaypee Brothers,7thEdition.
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

D20CTAT13	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, 6thedition

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

D20CTAT14	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 fordis 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 phenomeno, coombs test, immune fluorescence 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.diptheriae
- Clostridium tetani
- Clostridiumperfringens
- Mycobacterium tuberculosis
- Mycobacterium leprae

- E.coli
- Klebshiella 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 heamaggluations , 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”, 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.diptheriae
    - 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

D20CTAT15	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

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

HEPATOBILIARY

- 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

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

		L	P	Hrs
D20CTAT16	**ENGLISH**	**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 Leaners Dictionary, 1996
3. Quirk Randolph and Greenbaum Sidney, 1987. A University Grammar of English, Hong Kong: Longman group (FE) Ltd/Pearson.
4. Thomson A.J. and Maituiet A.V. 1987, A Practical English Grammar, Delhi: Oxford University Press.
5. Gimson A.C.1989, An Introduction to pronunciation of English. Hodder Arnold; 4th Revised edition (1 May 1989).
6. O'Connor J.D, 1986. Better English pronunciation. Cambridge: University Press
7. By water F.V.A. 1982, Proficiency Course in English. London: 1- lodder and Strongliton.
8. Roget S.P. 1960, Thesaurus of English Words & Phrases, London: Lowe & Brydone Ltd. 1960.

D20CTAT17	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 (8^{th} 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

		L	P	Hrs
D20RITT21	**DIAGNOSTIC IMAGING TECHNIQUES & MODALITIES**	**60**	**40**	**100**

MAMMOGRAPHY*:*

The Mammography as a clinical diagnostic tool- immobilization and identification techniques-positioning techniques for various projections - exposure factors- Conventional & Digital studies- quality and advantage- diagnosis and screening- Characteristics of benign and malignant lesions – patient care – female attendant- interventional procedures - radiation dose- recent advances in mammography techniques - mammotomogram & Sonomammography procedures- advantages & limitations.

ULTRASONOGRAPHY/ DOPPLERSTUDIES*:*

Techniques of sonography-selection- Preparations - instructions and positioning of patient for TAS, TVS, TRUS, neck USG and extremities- patient care and maintenance protocols-clinical applications display methods –quality image reproducible extend -assurance to patients.

CT SCAN STUDIES ACQUISITION/ PROTOCOLS/TECHNIQUES:

CT of head and neck – thorax – abdomen – pelvis – musculo skeletal system – spine – PNS. Anatomy – clinical indications and contraindications – patient preparation – technique – contrast media-types, dose, injection technique; timing, sequence - image display – patient care – utilization of available techniques & image processing facilities to guide the clinician-CT anatomy and pathology of different organ systems.

MRI - SCANNER*:*

Methods of MRI imaging methods – Head and Neck ,Thorax, Abdomen, Musculoskeletal System imaging - Clinical indications and contraindications-types of common sequences-effects of sequence on imaging - Protocols for various studies- slice section- patient preparation-positioning of the patient -patient care-calibration - paramagnetic agents and dose, additional techniques and recent advances in MRI -image acquisition-modification of procedures in an unconscious or un co-operative patient – plain studies-contrast studies -special procedures- reconstructions- 3D images- MRS blood flow imaging, diffusion/perfusion scans - strength and limitations of MRI- role of radiographer.

ANGIOGRAPHY AND CINE STUDIES/DSA

Conventional / DSA studies- Abdominal, visceral, peripheral, cerebral and cardiac angiography - arterial/venous anatomy, physiology-clinical indications and contraindications - patient preparation-positioning of the patient -patient care- contrast media - types of contrast - dosage - accessories catheters, guide wires- pressure injection- control of radiographic and fluoroscopic equipment - exposure factors for serial programmes-programming-injection protocols- outline on each radiological procedure- radiographer's role- patient management before -during and after the procedure-venography- interventional angiography in hepatobiliary, GIT, urology and vascular system –coils/stents etc-indication and contra-indications-role of radiographer –radiation safety.

NUCLEAR SCINTISCANPROCEDURES*:*

SPECT-CT & PET-CT studies, protocols, Basics of common clinical Nuclear Medicine procedures/techniques–comparison with different structural imaging studies- advantages and limitations***.***

RECENT ADVANCES IN IMAGING

Dynamic CT &MRI studies.

Pre- operative application of various imaging systems including detector probes application in Nuclear Medicine

Imaging guidance in therapeutic procedures-IGRT, TACE & TARE etc.

EQUIPMENTS OF ADVANCED MODALITIES

MAMMOGRAPHY SYSTEM*:*

History - Imaging requirements- Mammography system - construction/types accessories - tube, compression, grids, AEC etc- nature of X-Ray beam suitable accessories for immobilization - film processing - image quality - image recording devices - interventional procedures – accessories-biopsy equipment attachments - radiation dose - mammo tomogram-Sonomammography-future developments.

ULTRASONOGRAPHY/ DOPPLERSYSTEMS*:*

Basic acoustics principle- Basic physics of sound propagation in different media, production of Ultrasound (piezoelectric effect), ultrasound terminologies – interaction of ultrasound with matter – ultrasound properties propagation in tissue, absorption, scattering, reflection and refraction- acoustic impedence**–**piezo electric effect – transducer – Pulsar – receiver – beam/sensitivity and gain - generators- A, B and M scanning & echo modes- transducers-techniques of sonography-equipment selection- display methods – ultrasound image formation - data storage and display – image and artifacts – doppler instrumentation –doppler equation – transducer – quality assurance and performance tests – bio effects and safety considerations. Types of machines –portable systems- acoustic coupling agents-ingredients/preparation.

CT SCAN SYSTEMS*:*

History- generations of scanners-CT technology -helical/spiral & multi slice C.T- ultra fast scanners-system components - performance parameters - image quality and methods of image reconstruction-radiation dose measurements and technical aspects of Q.A -calibration and image acquisition.

MRI - SCANNERS:

History - basic physical principle - Physical principles -NMR signals– instrumentation- hard ware-MR system components- magnet system- Magnetic shielding- RF shielding- bio effects of MRI- site selection and safety

-reconstruction system - different coils used -NMR signals advantage -imaging methods – pulse imaging sequences - spectroscopy parameters -calibration and image acquisition - reconstructions- 3D images- - image contrast factors affecting image quality - artifacts - difference between CT and MRI images-host computer-viewing archiving-hardcopy-image formation and storage device.

ANGIOGRAPHY AND CINE STUDIES/DSA

Angiography equipments history –Conventional angiography X-Ray equipment - Equipment construction-principle - DSA system basics - digital techniques-subtraction process-procedures for subtraction - care, choice and installation of the equipment – equipment, pitfalls and complications -pressure injectors-contrast media -accessories-catheters, guide wires-uses of serial imaging devices- cine camera - video-recorder -film processing-radiationprotection.

NUCLEAR MEDICINE EQUIPMENTS

Nuclear Physics - basics in Nuclear Medicine- Nuclear medicine equipments - Gamma Cameras- rectilinear scanners- radioisotope generators-SPECT-CT & PET- CT- introduction-basic physics and principle involved- equipments basic structure differences- fusion techniques- image formation-storage devices– advantages- limitations.

RECENT ADVANCES IN IMAGING SYSTEMS

Mobile units of Computer Radiography & Digital Radiography system. 3D/4D Sonography systems
128 slice & higher slice C.T equipments. 3 Tesla & higher T MRI scanners
Image processing & Display systems-Recent advances, concepts and applications in processing of images in digital form using computer based systems.
Bone Densitometry

PICTURE ARCHIVING AND COMMUNICATION SYSTEMS

(PACS)- newer advancements – updates - systems designs-transfer restrictions.

REFERENCE BOOKS:

1. Step by Step CT; Step by Step MRI and MRI made Easy for beginners – Govind B. Chavhan – Jaypee brothers and Medical Publishers (p) Ltd, New Delhi CT & MRI protocol – Satish K. Bhargava, CBS publishers
2. Text book of Radiology for residents and technicians -4th edition –Satish.K Bhargava CBS publishers and distributors (p) Ltd.
3. Concepts in Medical Radiographic Imaging – Marianne Tortoice
4. Radiographic Imaging - Derrick
5. Processing and Quality Control – William

D20RITT22	RADIOGRAPHIC SPECIAL PROCEDURES & PATIENT CARE	L	P	Hrs
		60	40	100

NON-CONTRAST SPECIAL RADIOGRAPHY

PAEDIATRIC IMAGING:

Special needs of patient and radiographer- use of dedicated equipment and accessories-modified technical considerations - selection of exposure factors- image quality considerations - radiation protection of the patient - special techniques in children for contrast studies.

GERIATRIC RADIOGRAPHY:

Equipment and accessories – exposure factor considerations in special care. Elderly patients profile - difficulties during radiography – technical considerations- projections with unconventional special positioning.

TRAUMA/EMERGENCY RADIOGRAPHY:

Selection of suitable X-Ray equipment – patient position -radiographic projections and sequence for each patient – modification of routine positioning– radiation protection – patient care.

OPERATION THEATRE RADIOGRAPHY:

O.T procedures-Operative cholangiography – orthopaedic procedures – maintenance of asepsis – preparation of radiographer and equipment/accessories - careful safe use of mobile and fluoroscopic equipment – radiation protection – patient care – rapid availability of radiographic image-cooperation with OT staff- type of studies done -clinical applications - clinical applications- per operative radiographs- pre-operative fluoroscopy studies -patient care-radiation protection of all staff.

CONTRAST RADIOGRAPHY:

Radiologicalcontrastmedia–classification-needforradiologicalcontrastmedia-methods of administration-dosage-reactions to contrast media- role of radiographer in management of patient with contrast reaction. Forallcontrastinvestigations-patientpreparation,positioning,patientcareduring the study-post procedural patient care-types of contrast media used and dosage- alternative contrast used-side effects and its identification-treatment of complication during the procedure - pathological conditions- indications and contraindications- injection procedure –techniques for radiographic projections - radiographic appearances– radiation protection.

SIALOGRAM

- Barium studies- different types – Barium swallow Barium meal study of upper GIT, Barium meal follow through, Barium enema, small bowel enema, distal colography, defaecography.
- Percutaneous Transhepatic Cholangiogram, ERCP, T-Tube cholangiography, pre-operative cholangiography.
- VP-rapid sequence-infusion pyelography-high dose urography, Cystogram, Anterior Urethrogram RGU, MCU, RCP
- Angiography, Diagnostic & therapeutic, venography,Lymphangiogram
- Orthography,Discography
- Myelogram,
- Hysterosalphingography.
- Sinography.

- Fistulogram,
- Ductogram**.**

REFERENCE BOOKS:

1. Fundamentals of Special Radiographic Procedures –Albert M Snopek published by Elseveir
2. A guide on Special Radiographic Investigations and Techniques – Dr.Kushal Gehlot and Lalit Agarwal published by JBD

PATIENT CARE

- Patient vital signs-temperature, pulse, respiration and blood pressure-normal values and methods of taking and recording them.

- Development of communication skills with patient- general comfort and reassurance to the patient-patient education and explaining about the study- drugs used in the preparation of the patient. Handling of an unconscious patient- shifting of patients - hazards of lifting and maneuvering patients - rules for correct lifting- transfer from chair/wheel chair or trolley to couch and vice-versa - safety of patient and worker while lifting & shifting of patients- handling of geriatric, pediatric and trauma patients -handling female patients-pregnant women.

- Communicable diseases - hygiene in the department-cross infection and prevention-handling of infectious patients in the department -application of asepsis.

		L	P	Hrs
D20RITT23	**RADIOGRAPHIC POSITIONING & TECHNIQUES**	**60**	**40**	**100**

CONVENTIONAL NON CONTRAST RADIOGRAPHY

EXTREMITIES RADIOGRAPHY:
Hand- Finger –MCP- Wrist joint- Forearm -Elbow joint – humerus - shoulder joint. Foot – Toes- Tarsal bones -Ankle joint - Knee joint – patella – tibia- femur – Hip joint – pelvis -sacroiliac joint.

SPINE RADIOGRAPHY:
Vertebral column – Atlanta occipital articulation- cervical spine- dorsal spine lumbar spine – sacrum - vertebral canal- vertebral foramen.

SKULL RADIOGRAPHY:
General, sella – temporal bone – mastoid – optic foramen – Internal auditory canal – Superior and inferior orbital fissure – base of skull – facial bones – petrous apex – Zygomatic bone, nasal bone, sinuses of skull – mandible – Tempro- mandibular joint – Paranasal sinuses Radiography.

CHEST RADIOGRAPHY :
Basic views (PA & AP) - inspiratory & expiratory films- special chest views & their significance – larynx-trachea- thoracic inlet -Sternum - Ribs – Heart and great vessels – mediastinum - Diaphragm – double exposure technique.

ABDOMEN & PELVIC RADIOGRAPHY – all projection – the acute abdomen investigation.

SOFT TISSUE RADIOGRAPHY:
Preparations, Instructions, Various techniques, positioning digital mammography, High and low KV Technique – radiography – technique for steep range radiography – intensifying screen.

STEREO RADIOGRAPHY:
Conventional and differential filtration – multiple, Duplication – arrangement of Principle – tube shifting relation of patient – correct making and viewing of stereo radiographs – Application.

MACRO RADIOGRAPHY*:* Principle sizes of focal spot its limitation in its application.

HIGH KV TECHNIQUE: technique & usefulness.

BODY LOCALIZATION:
Preparation – Anatomical localization – various projections – use of skin markers – Tangential projection – uses – opaque – foreign bodies.

DENTAL RADIOGRAPHY:
Types of equipments –techniques- indications - films-dental radiography in trauma patients.

REFERENCE BOOKS:

1. A Guide on Special Radiographic Investigations & Techniques, Lalit Agarwal, Dr. Kushal Gehlot
2. Bontrager's Handbook of Radiographic Positioning and Techniques, John Lampignano, Leslie Kendrick
3. Contrast and Special Radiographic Procedures, A.P. Saxena, ISBN 9789385935916
4. Bontrager'S Handbook of Radiographic Positioning And Techniques, 1st South Asia Edition John Lampignano, Publisher: Elsevier Science

		L	P	Hrs
D20CTAT21	**ETHICS**	**30**	**-**	**30**

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