

**CENTURION UNIVERSITY OF TECHNOLOGY AND
MANAGEMENT, ANDHRA PRADESH**

SCHOOL OF PARAMEDICS & ALLIED HEALTH SCIENCES



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

**BACHELOR OF SCIENCE IN
CARDIOVASCULAR TECHNOLOGY**

SYLLABUS

2024-25

COURSE STRUCTURE

SEMESTER - 1

S.No.	Subject Code	Subject	Subject Type	Credits
			(T - P- Pj)	
1	CUTM	General Anatomy	3 2 0	5
2	CUTM	General Physiology	3 2 0	5
3	CUTM	Basic Biochemistry	3 2 0	5
4	CUTM	Cell Biology	3 0 1	4
5	CUTM	Basic Radiation Physics	3 0 1	4
6	CUTM	Basic Computer and information Sciences	1 1 0	2
		Total Credits		25

SEMESTER 2

S.No	Subject Code	Subject	Subject Type	Credits
			(T - P- Pj)	
7	CUTM	Hospital Management	3 0 1	4
8	CUTM	Pharmacology	3 0 1	4
9	CUTM	General microbiology	3 0 1	4
10	CUTM	BMIT	3 0 1	4
11	CUTM	EVS	0 0 2	2
12	CUTM	Proficiency in English	0 0 2	2
		Total Credits		20

SEMESTER 3

S.No	Subject Code	Subject	Subject Type	Credits
			(T - P- Pj)	
13	CUTM	Basic of Cardiac care tech	3 2 0	5
14	CUTM	Medical emergency and patient care	3 0 1	4
15	CUTM	Interpretation of echocardiography	3 0 1	4
16	CUTM	Pathology	3 2 0	5
		Total Credits		18

SEMESTER 4

S.No	Subject Code	Subject	Subject Type	Credits
			(T - P- Pj)	
17	CUTM	Basic Cardiac Evaluation	3 2 0	5
18	CUTM	Coronary angiography	3 2 0	5
19	CUTM	Medical law and ethics	3 0 0	3
20	CUTM	Medical disorder & Incentive care	3 0 1	4
		Total Credits		17

SEMESTER 5

S.No	Subject Code	Subject	Subject Type	Credits
			(T - P- Pj)	
21	CUTM	Cardiac Evaluation	3 2 0	5
22	CUTM	Cardiac Therapies	3 2 0	5
23	CUTM	Clinical Cardiac Care tech	3 2 0	5
24	CUTM	Advanced echocardiography	3 0 1	4
		Total Credits		19

SEMESTER 6

S.No	Subject Code	Subject	Subject Type	Credits
25	CUTM	Internship & Project		18
26	CUTM	Internship & Project		18

Value Added Courses:

Students can choose any suitable skill course offered by the University in semester any semester.

Note: Skill course & Value-added course, to be opted by the student along with the regular courses, as suggested in the syllabus.

BASKET - 1						
School Core Courses						
Sl.No.	Subject Code	Subject	Subject Type			Credits
			(T - P- Pj)			
SC-1	CUTM1757	General Anatomy	3	2	0	5
SC-2	CUTM1758	General Physiology	3	2	0	5
SC-3	CUTM1759	Basic Biochemistry	3	2	0	5
SC-4	CUTM1760 /1729/1761	Biology / Cell Biology / Mathematics	3	0	1	4
SC-5	CUTM1742	Basic Computer and information Sciences	1	1	0	2
Total Credits						21

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM1757	General Anatomy	3 2 0	5

Course Objectives:

- ◆ To obtain Knowledge about the general anatomy – the structure of different organs and position of the organ.
- ◆ To familiarize the student with the different anatomical terminology and positions of the body.
- ◆ To develop the students to identify the structural reinforcement of the anatomical structures of human body, which would help the student to develop 3D images of the organs

Learning Outcomes:

- ◆ Can acquire knowledge about the general anatomy – the structure of different organs and position of the organ.
- ◆ The student get familiarize with the different anatomical terminology and positions of the body.
- ◆ One can technically identify the structural reinforcement of the anatomical structures of human body, which would help the student to develop 3D images of the organs.

Module -1: INTRODUCTION TO ANATOMY AND SKELETON

Sub division of anatomy, terms and terminology, body cavities and membranes, directional terms, abdominal regions, types of body movements systems of the Body. Classification of bones & anatomy of long bone.

Module –2: RESPIRATORY & DIGESTIVE SYSTEM

Respiratory system: Anatomy of nose, pharynx, trachea, bronchi, lungs, broncho-pulmonary segments, ribcage & intercostals muscles

Digestive system: Anatomy of mouth, pharynx, oesophagus, stomach, small intestine, large intestine, rectum, anus. Anatomy of liver, gall bladder & pancreas

Module -3: CARDIOVASCULAR SYSTEM & LYMPHATIC SYSTEM

Anatomy of heart, systemic circulation, anatomy of artery, vein & capillary, major blood vessels of the body.

Anatomy of lymphatic system – lymphatic vessels, lymphatic nodes, spleen, thymus, tonsils, peyer's patches

Module -4: EXCRETORY & INTEGUMENTARY SYSTEM

Anatomy of kidneys, ureters, urinary bladder, urethra

Anatomy of skin, nails & hair

Module -5: MUSCULAR SYSTEM

Structure of muscle fibre, head and neck muscles (frontalis, orbicularis oculi, orbicularis oris, buccinators, zygomaticus, chewing muscles, platysma, sternocleidomastoid), trunk muscles (pectoralis major, intercostals muscles, muscles of the abdominal girdle, trapezius, latissimus dorsi, erector spinae, quadrates lumborum, deltoid), muscles of upper & lower limb (major muscles)

Module -6: NERVOUS SYSTEM & SPECIAL SENSE ORGANS

Nervous system: classification and parts of nervous system, anatomy of brain, spinal cord, meninges,

structure of neuron, spinal nerves, cranial nerves & nerve plexus

Special sense organs: Structure and function of Visual system, auditory system, gustatory system, olfactory system.

Module -7: SKELETAL SYSTEM & NECK ANATOMY

Structure of long bone, Development Of Bone, Classification Of Bones. Classification of joints with examples

Anatomy of neck & neck triangles, muscles of mastication, temporo-mandibular joint

Module -8 (Only for optometry)

OCULAR ANATOMY: orbit and its contents, ocular muscles- origin, insertion. Action and its nerve supply, movements.

Only for radiographers:

Surface anatomy of all systems

PRACTICE

1. Identification and description of all anatomical structures.
2. The learning of Anatomy is by demonstration only through dissected parts, slides, models, charts, etc.
3. Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).
4. Demonstration of skeleton- articulated and disarticulated.
5. During the training more emphasis will be given on the study of bones, muscles, joints, nerve supply of the limbs and arteries of limbs.
6. Surface anatomy: Surface land mark-bony, muscular and ligamentous. Surface anatomy of major nerves, arteries of the limbs. Points of palpation of nerves and arteries

Suggested Readings

1. Text book Anatomy & Physiology for nurses by Evelyn Pearce, Publisher Faber& Faber.
2. Text book Anatomy and Physiology for nurses by Sears, Publisher Edward Arnold.
3. Anatomy & Physiology- by Ross and Wilson, Publisher Elsevier.

Reference Books

1. Anatomy& Physiology: Understanding the human body by Clark, Publisher Jones & Bartlett.
2. Anatomy and Physiology for nurses by Pearson, Publisher Marieb & Hoehn.
3. Anatomy and Physiology by N Murgesh, Publisher satya

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM1758	General Physiology	3 2 0	5

Course Objectives:

- ◆ To obtain Knowledge about the general physiological systems and physiological terminology.
- ◆ To familiarize the student with the functionality of different physiological systems.
- ◆ To develop the technical skills in identifying the Biopotential and their recording and advanced systems.

Learning Outcomes:

- ◆ □ Can acquire knowledge about the general physiological systems and physiological terminology.
- ◆ □ The student get familiarize with the functionality of different physiological systems
- ◆ □ One can technically identify the Biopotential signals, their recording and advanced systems.

Module -1

Scope of physiology. Definition of various terms used in physiology.

Structure of cell, function of its components with special reference to mitochondria and microsomes.

Elementary tissues: Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.

Module -2

Cardiovascular System: Composition of blood, functions of blood elements.

Blood group and coagulation of blood

Brief information regarding disorders of blood

Heart: myocardium–innervations– transmission of cardiac impulse– Events during cardiac cycle– cardiac output. Structure and functions of various parts of the heart

Module-3

Circulation: General principles, Peripheral circulation: peripheral resistances–arterial blood pressure–

measurements–factors, Regulation variations–capillary circulation–venous circulation.

Special circulation: coronary cerebral–miscellaneous, Arterial and venous system with special reference to the names and positions of main arteries and veins. Brief information about cardiovascular disorders.

Module -4

Respiratory system: Various parts of respiratory system and their functions, physiology of respiration.

Mechanics of respiration–pulmonary function tests–transport of respiratory gases–neural and chemical

regulation of respiration–hypoxia, –asphyxia.

Module-5

Urinary System: Various parts of urinary system and their functions, structure and functions of kidney,

structure of nephron– mechanism of urine formation, composition of the urine and abnormal constituents, urinary bladder & micturition. Patho-physiology of renal diseases and edema.

Practice: - Examination of pulse, B.P, Respiratory rate, Heartbeat, impulses etc.

Identification of different artery and Venous supply from chart or PPT.

Module-6

Digestive System: names of various parts of digestive system and their functions. structure and functions of liver, physiology of digestion- functions and regulations of Salivary digestion, Gastric pancreatic digestion, Intestinal digestion and absorption.

Lymphatic system: Name and functions of lymph glands, Reticulo endothelial system: Spleen, lymphatic tissue, Thymus

Module-7

Nervous System: Neuron–Conduction of impulse– synapse–receptor. Sensory organization– pathways and perception, Reflexes–cerebral cortex– functions. Thalamus–Basal ganglia Cerebellum, hypothalamus. Autonomic nervous system– motor control of movements.

Reproductive system. Structure and function of Male reproductive system–control & regulation, Female reproductive system– uterus–ovaries–menstrual cycle–regulation–pregnancy & delivery–breast–family planning

PRACTICE

1. Identification of different organs and systems from charts
2. Identification of different blood cell, their normal and abnormal morphology from slides.
3. Examination of pulse, B.P., Respiratory rate.
4. Reflexes
5. Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC,
6. ERV, EC, residual volume on Spirometry.
7. Estimate of Hemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count.
8. Blood indices, Blood grouping, Bleeding & Clotting time

Text books

1. Text book Anatomy & Physiology for nurses by Evelyn Pearce, Publisher Faber& Faber.
2. Text book Anatomy and Physiology for nurses by Sears, Publisher Edward Arnold.
3. Anatomy & Physiology- by Ross and Wilson, Publisher Elsevier.

Reference Books

1. Anatomy& Physiology: Understanding the human body by Clark, Publisher Jones & Bartlett.
2. Anatomy and Physiology for nurses by Pearson, Publisher Marieb & Hoehn.
3. Anatomy and Physiology by N Murgesh, Publisher satya.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM1759	Basic Biochemistry	3 2 0	5

Course Objectives:

- ◆ Biochemistry is the study of biological phenomena at the molecular level.
- ◆ Its aim is to understand the fundamental chemical principles that govern complex biological systems.
 - ◆ The program is an interdepartmental major between biology and chemistry that emphasizes the importance of a solid foundation in the natural sciences.
- ◆ The major focuses, however, on disciplines within biology and chemistry, ranging from cell biology and molecular biology to analytical chemistry and physical chemistry.

Learning Outcomes:

- ◆ Biochemistry helps in clinical diagnosis, understanding pathology of diseases, treatment of diseases, designing of drugs and understanding their metabolism and manufacture of various biological products like amino acids, proteins, antibiotics, hormones, enzymes, nutrients, etc.
- ◆ It is expected that the students become conversant with the Fundamentals of Biochemistry which can be applied in clinical diagnosis of the metabolic disorders

Module-1

Enzymes - Introduction, definition, structure of enzyme, classification, coenzymes, isoenzymes, importance of enzyme inhibition

Module-2

Chemistry of carbohydrates - Introduction, definition, classification, biomedical importance & properties Brief outline of metabolism and significance of Glycogenesis, glycogenolysis, Gluconeogenesis, Glycolysis, citric acid cycle, HMP shunt

Module-3

Amino acids - Definition, classification, essential & non-essential amino acids
Chemistry of Proteins - Introduction, definition, classification, biomedical importance

Module-4

Ammonia formation & transport, Urea cycle, metabolic disorders in urea cycle
Importance substances derived from Phenylalanine, Tyrosine & Tryptophan, glycine

Module-5

Chemistry of Lipids & their related metabolism - Introduction, definition, classification, biomedical importance, brief description about essential fatty acids

Fatty liver, Ketosis, Cholesterol & its clinical significance, Lipoproteins and their importance

Module-6

Blood glucose levels, HbA1C, glucose tolerance test, glycosuria,

Hyperglycemia & Hypoglycaemia & their causes

Module-7

Diagnostic value and importance of Cardiac markers, LFT, RFT, Pancreatic markers, serum electrolytes, lipid profile, serum markers

Biochemistry practical

Quantitative exercises:

Detection of abnormal constituents in urine, sugar, proteins, ketones, blood and bile salts Bens Jones protein.

Phlebotomy equipments

Identification of Blood Collection Tubes & Centrifugal Separation of Blood Plasma and Serum

Techniques:

Colorimeter, blood chemistry analyzer.

Demonstration:

Estimation of blood cholesterol

Estimation of alkaline phosphate

Salivary amylase test (effect of PH and Temperature)

Estimation of Serum creatinine

Estimation of Serum uric acid

Estimation of total protein.

Text books

1. Text book of Medical Laboratory Technology, P.B. Godkar 2nd Edn. 2003 Bhalani Publication.
2. Text book of Biochemistry, M. A. Siddique 8th Edn.1993 Vijay Bhagat Scientific Book Co., Patna.
3. Medical Biochemistry by AC Dey.
4. Handbook of Christen Medical Association, India Medical Laboratory Technology- Robert H. Carman.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTMI729	Cell Biology	3 0 1	4

Course Objectives

- ◆ To make the student understand all type of cells and cellular components, and how cell works in healthy and diseased states

Learning Outcomes

Students will understand:

- ◆ The structures and purposes of basic components of prokaryotic and eukaryotic cells.
- ◆ How the cellular components are organized and perform specific functions.
- ◆ The cellular components underlying mitotic and meiotic cell division.
- ◆ The cellular abnormalities and variations

Module- 1 (11 Hrs)

Overview of Cells; Cell theory; Prokaryotic and Eukaryotic cells; Virus; Viroids; Mycoplasma; Prions

Module- 2 (10 Hrs)

Plasma Membrane: Various models of plasma membrane structure; Transport across membranes: Active and Passive transport, Facilitated Transport; Cell junctions: Tight junctions, Gap junctions, Desmosomes, Hemidesmosomes

Module- 3 (6 Hrs)

Endomembrane System: Structure and Functions of Endoplasmic Reticulum, Golgi Apparatus, Lysosomes

Module- 4 (8 Hrs)

Mitochondria: Structure and function, Semi-autonomous nature, Endosymbiotic hypothesis, Chemiosmotic hypothesis, Mitochondrial electron transport chain; Peroxisomes: structure and function.

Module- 5 (10 Hrs)

Cytoskeleton: Structure and Functions: Microtubules, Microfilaments and Intermediate filaments; Nucleus: Structure of Nucleus: Nuclear envelope, nuclear pore complex, Nucleolus, Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome)

Module 6

Cell Division and Cell cycle: Mitosis, Meiosis; Regulation of cell cycle

Module- 7 (10 Hrs)

Cell Signalling: Overview of cell signalling, signalling molecules and receptors, GPCR, Second messengers, Role of second messenger (cAMP) in cell signalling, Activation of gene transcription by GPCR

Text Books:

1. Karp, G. (2010). Cell and Molecular Biology: Concepts and Experiments. VI John Wiley and Sons. Inc.
2. De Robertis, E.D.P. and De Robertis, E.M.F. (2006). Cell and Molecular Biology. VIII Edition. Lippincott Williams and Wilkins

Reference Books:

1. Cooper, G.M. and Hausman, R.E. (2009). The Cell: A Molecular Approach. V ASM Press and Sunderland, Washington, D.C.; Sinauer Associates, MA.
2. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. (2009). The World of the Cell. VII Edition. Pearson Benjamin Cummings Publishing, San
3. Bruce Albert, Bray Dennis, Levis Julian, Raff Martin, Roberts Keith and Watson James (2008). Molecular Biology of the Cell, V Edition, Garland publishing Inc., New York and London

BASKET - 2				
Discipline Core Courses				
Sl.No.	Subject Codes	Subject	Subject Type	Credits
			(T - P- Pj)	
DC-1	CUTM1762	Basic Radiation Physics	3 0 1	4
DC-2	CUTM	Pathology	3 2 0	5
DC-3	CUTM	Pharmacology	3 0 1	4
DC-4	CUTM	General microbiology	3 0 1	4
DC-5	CUTM	Basic Medical Instrumentation and Techniques	3 0 1	4
DC-6	CUTM	Environmental Studies	0 0 2	2
DC-7	CUTM	Proficiency in English	0 0 2	2
DC-8	CUTM	Basic of Cardiac care Tech	3 2 0	5
DC-9	CUTM	Medical emergency and patient care	3 0 1	4

DC-10	CUTM	Interpretation of Electrocardiography	3 0 1	4
DC-11	CUTM	Hospital Management	3 0 1	4
DC-12	CUTM	Basic Cardiac Evaluation	3 2 0	5
DC-13	CUTM	Introduction to Cardiac Technology	3 2 0	5

DC-14	CUTM	Medical law and ethics	3	0	0	3
DC-15	CUTM	Medical disorder & Incentive care	3	0	1	4
DC-16	CUTM	Cardiac Evaluation	3	2	0	5
DC-17	CUTM	Cardiac Therapies	3	2	0	5
DC-18	CUTM	Clinical Cardiac Care tech	3	2	0	5
DC-19	CUTM	Coronary angiography	3	0	1	4
DC-20	CUTM	Project		NA		18
DC-21	CUTM	Internship		NA		18
		Total Credits				114

BASKET – 2

DETAILED SYLLABUS

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM1762	Basic Radiation Physics	3 0 1	4

Module-1

Modern Atomic Physics: Constituents of matters & atomic structure, orbits and orbital, binding energy and mass defect, isotopes, isotones and isobars, electromagnetic and particle radiations.

Module-2

Introduction of X-ray tube : Features of X-ray tube, anode, cathode and filament, characteristics of target materials, cooling system, insulation and tube housing, filters, rating of tubes, faults of X-ray tubes; Interaction of radiation with matter – coherent, Compton, Photoelectric, pair production and photon disintegration.

Module-3

TYPES OF X RAY TUBES & GENERATORS : Gas tube, Hot cathode tube, fixed anode and rotating anode tube, line-focus tube, dual focus tube, Mammography X-ray tube; X-ray generators, power supply: transformers, Half-wave and full-wave rectifications, Exposure timer.

Module-4

Heat radiation, perfect black body, Stefan law, application in Diagnostic Radiology (Heat dissipation in both stationary and rotating X-ray tubes).

Module-5

Heat Definition of heat, temperature, Heat capacity, specific heat capacity, Heat transfer conduction, convection, radiation, thermal conductivity, equation for thermal conductivity (k), the value of k of various material of interest in radiology, thermal expansion, Newton's law of cooling,

Module-6

Physical Principles of X-ray Diagnosis: Radiological images: Photon fluence, Unsharpness, resolution, Contrast, scattered radiation, grids, fluoroscopy. Portable x-ray & Mobile X-Ray machine.

Module-7

Radioactivity: Radioactivity decay, half-life & mean-life, decay series, modes of decay: alpha, beta and gamma radiation, electron capture, internal conversion, isomeric transition, production of radioisotopes. Production of X-Rays: Discovery and origin of X-rays, Production of X-rays, Nature and properties of X-rays, Energy spectrum, characteristic radiations & bremsstrahlung radiation, X rays interaction with matter, Absorption, scattering and quality of X-rays, HVT and TVT, Angular distribution

Text books

1. Textbook of Radiological Safety by K. Thalayan, Publisher Jaypee brothers
2. Advance Medical Physic by Rehani, Publisher Jaypee brothers
3. Basic of Radiological Physics by K.Thalayan, Publisher Jaypee brothers

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Pathology	3 2 0	5

Module-1

Introduction of pathology Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia. Clinical Pathology collection, transport, preservation, and processing of various clinical specimens. Urinalysis - collection. Preservatives, physical, chemical examination and microscopy.

Module-2

Inflammation- acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation-general features, granulomatous inflammation, tuberculosis. Healing and repair - Definition, different phases of healing, factors influencing wound healing, fracture healing.

Module-3

Haemodynamic disorders-Oedema, hypermia, congestion, haemorrhage, embolism, thrombosis, infarction. Neoplasia - definition, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions. Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies.

Module-4

Haematological Disorders, Introduction and Haematopoiesis, Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency , lab findings, megaloblastic anaemia: causes, lab findings, haemolytic anemias: definition. Causes, classification and lab findings.WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias.

Module-5

Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and Causes, classification and lab findings.WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias. Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings. Pancytopenia.

Module-6

Basic Hematological Techniques : Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions, complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

Module-7

Transfusion Medicine Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications. Physical examination; volume, color, odor, appearance, specific gravity and ph, Chemical examination; strip method- protein - heat and acetic acid test, sulfosalicylic acid method, reducing sugar-benedicts test, ketone bodies - rotheras test, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and schwartz test, bence jones protein.

REFERENCE BOOKS • Pocket companion to Pathologic Basis of Disease by Robbins and Cotran, 7th edition, Saunders. • Pathology Quick Review and MCQs by Harsh Mohan, 2nd edition, Jaypee Publications

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM4367	Pharmacology	3 0 1	4

Module 1

GENERAL PHARMACOLOGY : Principles of drug administration and routes of administration, dosage and factors modifying it. Pharmacokinetics: Absorption, Distribution, Metabolism, Excretion of drugs, factors influencing drug action, Drug Nomenclature and Essential Drugs Concept. Pharmacodynamics: Drug allergy, poisoning & toxicity, synergistic, antagonistic effect of drugs plasma half life , drug efficacy & potency , mechanism of drug action, adverse drug reaction.

Module-2

Autonomic Nervous System: Cholinergic & anticholinergic drugs, skeletal muscle relaxant, Sympathomimetics drugs (adrenergic drugs), alpha & beta blockers. Cholinergic drugs: Introduction, Receptor pharmacology, Classification with examples. Receptors with intrinsic enzymatic activity, the receptor with intrinsic catalytic activity, receptor tyrosine kinases.

Module-3

Central Nervous System : Sedative & hypnotics , local & general anesthetics , Antiepileptic & Antipsychotics, Antidepressant & Analgesics. **Cardiovascular System** : Antihypertensive drugs , Anti-anginal drugs , Anti arrhythmic drugs, Cardiac glycosides, plasma expanders, Chemotherapy.

Module-4

Antibiotics: Classification, Penicilin-G, Amoxicillin, Ampicillin, Cephalosporins, Aminoglycosides: Streptomycin, Gentamicin, Amikacin, Macrolide antibiotics: Azithromycin, Metronidazole. **Antiretroviral drugs:** Acyclovir, **Antifungal** : Amphotericin B, Ketoconazole, **Antitubercular drugs:** Classification, Mechanism of Action, Pharmacological action. Uses and Adverse Drug Reaction of first line Anti-TB drugs.

Module-5

Drugs acting on Respiratory system a) **Drugs for cough:** Classification, codeine, dextromethorphan
Subject Code Name of the Subject T - P- Pj Credits CUTM Pharmacology 3 0 1 4 b) **Drugs for bronchial asthma:** Definition of asthma, classification of drugs Mechanism of Action, Pharmacological action, Uses and Adverse Drug Reaction **Drugs acting on kidney:** Diuretics: Definition and Classification, Mechanism of Action, Pharmacological action, Uses and Adverse Drug Reaction of Furosemide (High efficacy diuretics), Thiazides (Medium efficacy diuretics), Spironolactone and Mannitol (Weak diuretics), Antidiuretics: Classification, Mechanism of Action, Pharmacologic.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	General Microbiology	3 0 1	4

Module 1:

Introduction History of microbiology, Classification, shape and arrangements of microorganisms, special characteristics, spores, capsules, enzymes, motility and reproduction.

Module 2:

Immunology Infection: Sources of infection, portals of entry and spread of infection. Nonspecific immunity, Immunity – natural and acquired Immunity, Immunization schedule, applications of antigen antibody reactions, Hypersensitivity

Module 3:

Growth & nutrition: Growth & nutrition, Culture Media & Methods, Sterilization & Disinfection, Fundamental aspects of antibacterial agents and antimicrobial susceptibility testing.

Module 4:

Bacteriology: Introduction to Bacteriology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C diphtheriae, Mycobacteria, Clostridia, Bacillus, Klebsiella,

Module 5:

Virology Introduction to virology, viral hepatitis, poliomyelitis, Rabies, HIV, FLU(Influenza), Dengue,Chikungunya.

Module 6:

Mycology & Parasitology Introduction to mycology, pathogenic yeasts & fungi, Introduction to parasitology, Amoebiasis, Malaria, Helminthic infections.

Module 7:

Applied Microbiology Outline of common bacterial diseases, treatment & prevention-Respiratory tract infections (upper & lower), Meningitis (septic & aseptic), Enteric infections (food poisoning & gastro enteritis), Anaerobic infections, Skin & soft tissue infections, Urinary tract infections, sexually transmitted diseases, Tuberculosis & Leprosy, Hospital acquired infections, Biomedical waste management.

PRACTICAL EXERCISES:

• Demonstration of Sterilization Methods • Spotters • Gram staining. • ZN Staining

REFERENCE BOOKS •

Textbook of Microbiology by Ananthanarayan & Panicker's, 8th edition-Universities Press (India) PVT LTD. • Textbook of Microbiology by C. P. Baveja, 4th edition, Arya Publications. • Textbook of Medical Parasitology, CK Jayaram Paniker, 5th edition, Jaypee Publications. • Medical Parasitology by C. P. Baveja & V. Baveja, 2nd edition, Arya5. Publications.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Basic Medical Instrumentation and Techniques	3 0 1	4

Module-1 Biopotential Electrodes and Transducers: -

Introduction, Design of Medical Instruments, Components of the biomedical instrument system, Electrodes, Transducers

Module-2 Biopotential Recorders: -

Introduction, Characteristics of the recording system, Electrocardiography (ECG), Electroencephalography(EEG),Electromyography(EMG),Electroretinography (ERG), Electrooculography (EOG)

Module-3 : Physiological Assist Devices: -

Introduction, Pacemakers, Pacemaker batteries, Artificial Heart Valves, Defibrillators, Nerve and Muscle Simulators, Heart-Lung Machine, Kidney Machine,

Module 4: Operation Theatre Equipment: -

Introduction, Surgical diathermy, Microwave diathermy, Ultrasonic diathermy, Therapeutic effect of heat, Ventilators, Anesthesia Machine, Blood Flow meters, Cardiac Output Measurements, Blood Gas Analysers, Oximeters,

Module 5: Specialized Medical Equipment: -

Introduction, Blood Cell Counter, Electron Microscope, Radiation Detectors, Photometers and Colorimeters, Digital Thermometer, Audiometers, Radiography and Fluoroscopy, Angiography,

Module 6: Safety Instrumentation: -

Introduction, Radiation safety instrumentation, Physiological effects due to 50Hz current passage, Micro shock and Macro shock, Electrical Accidents in Hospitals

Module 7: Advances in Biomedical Instrumentation: -

Introduction, Computers in medicine (Tele-Radiology), Computer Tomography (CT), Thermography, Ultrasonic Imaging Systems, Magnetic Resonance Imaging (MRI), Biofeedback instrumentation, Biomaterials.

Text books:

1. Biomedical Instrumentation by Dr. M. Arumugam

Reference books:

1. Biomedical Instrumentation and Measurements by L Cromwell, FJ Weibell, EA Pfeiffer
2. Handbook of Biomedical Instrumentation, R S Khandpur, 2003, 1987, Tata McGraw-Hill Publishing Company Limited.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Proficiency in English	0 0 2	2

Module-1

Functions of English I

Self-introduction, Description (People, place, Things etc.), Planning

Module-2

Functions of English II

Asking for Information and Giving information, Explaining Processes and Products,

Understanding Instructions, Expressing Opinions

Module-3

Presentation Skills and Group Discussion

JAM (Just A Minute) sessions, Group Discussion

Skills: Types, GD Skills (Analyze, persuade, control emotions etc.), Presentation

Skills: Preparation, Practice, Feedback Books Recommended

1. Jones, L. & B. Cvan. (1983). Functions of American English. Cambridge: Cambridge University Press
2. Professional Communication, Aruna Koneru, TMH
3. An Introduction to Professional English and soft skills by B.K Das et al., Cambridge University Press

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Environmental Studies	0 0 2	2

Module-1

Environment and its multidisciplinary nature; Need for public awareness; Renewable and non-renewable resources-forest, water, mineral, land, food and energy resources: Structure and function of ecosystems of forest, grass land. desert and aquatic types.

Module-2

Biodiversity and its conservation: Biodiversity at global, national and local levels; Threats to biodiversity -Habitat loss; wild life poaching and man-wildlife conflicts; Endangered and endemic species; conservation measures. Causes, effects and control measures of pollution, air, water and noise pollution; nuclear hazards; solid-waste management.

Module-3

Causes, effects and control measures; Management of disasters due to natural causes of floods, earthquakes, cyclones and landslides. Social issues and the environment: Sustainable environment, Water conservation measures; Rain water harvesting; Resettlement and rehabilitation of people; Climate change and global warming: Acid rain; Ozone layer depletion; water land reclamation; Consumerism and waste products; Features of Environment Protection Act. Air pollution and Control of Pollution Acts; Water Pollution and its Control Act. Effects of Pollution explosion on environment and public health; Need for value education to Protect environment and resources.

Text Book:

1. Anubhav Kaushik & C.P. Kaushik: Environmental Studies -New age International Publishers.

Reference Books:

1. Benny Joseph: Environmental Studies -Tata Mac Graw Hill

2. E. Bharucha: Text book of Environmental Studies for under graduate courses- Universities Press. (Book prepared by UGC Committee)

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Medical law and ethics	2 0 1	3

Module-1

1. The Indian medical council act, 2. Medical council of India (functions), 3. Functions of state medical councils, 4. The declaration of Geneva

Module-2

1. Duties of medical practitioners 2. Regarding red cross emblem 3. Professional secrecy
4. Privileged communication.

Module-3

1. Professional negligence 2. Medical mal occurrence 3. Contributory negligence 4. Criminal negligence

Module-4

1. Corporate negligence 2. Ethical negligence 3. Precautions against negligence 4. difference between professional negligence and infamous conduct.

Module-5

1. Malpractice litigation involving various specialities 2. Prevention of medical negligence
3. supreme court of India guidelines on medical negligence 3. The therapeutic misadventure
4. Vicarious liability

Module-6

1. Products liability 2. medical indemnity insurance 3. Medical records 4. Consent in medical practice

Module-7

1. Euthenasia 2. Deaths due to medical care 3. Malingering

Text books

1. Medical Law and Ethics by Shaun D Pattinson, 5th edition, 2017

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Basics of Cardiac care Tech	3 2 0	5

Module-1

Applied Anatomy and Physiology -

Applied Anatomy

Structure of the heart and gross anatomy, normal position situs solitus, situs inverses with dextrocardia, situs solitus with dextrocardia, situs inversus with levocardia. Systemic and pulmonary circulation, coronary structure, coronary sinus structure and circulation. Chest topography - identification of imaginary lines, topographical landmarks over thorax, topography of heart and lungs. Surface marking of heart, aorta, pulmonary artery, precordium, heart valves, subclavian.

Module-2

Applied Physiology

Control of heart rate.
 Concepts of congenital heart (ASD, VSD, PDA, TOF and transpositions).
 Blood circulation, cardiac output, pulmonary circulation, pulmonary oedema
 Concepts of myocardial functions.
 Control of circulation
 Conduction system of the heart.

Module-3

Noninvasive ECG and TMT - ECG

- (a) Technique of ECG recording
- (b) ECG Leads system
- (c) ECG waves - PQRSTU, Osborn wave, delta wave, epsilon wave.
- (d) ECG rates, rhythm, axis calculation, lead positioning.
- (e) Intervals and segments - PR interval, PR segment, ST segment, QT interval, J point and QRS complex.
- ECG anatomy - Chambers enlargement.
- (f) Technical artefacts
- (g) ECG reporting Exercise Testing to Diagnose Obstructive Coronary Artery Disease - Rationale and Guidelines, Pretest Probability (true positive, false positive, true negative and false negative ST-Segment Interpretation, Confounders of Stress ECG Interpretation. -Result Reporting

Module-4

Noninvasive Echocardiography -

- (a) Introduction and purposes, demonstration of machine parts,
- (b) Basic windows
- (c) Echocardiographic views
- (d) Parts
- (e) Basic windows
- (f) Echocardiographic views

(g) Imaging modes - two-dimensional (2D) imaging, M-mode imaging, and Doppler imaging, color - flow mapping

Module-5

Invasive technologies -

- (a) Orientation to the Cath - Lab and biomedical equipments, Introduction and purposes of the Cath - Lab.
- (b) Radiation safety and protocols.
- (c) Vascular access - arterial in femoral, radial and ulnar, venous in femoral.
- (d) Catheterization left heart and right heart, Angiography - Chambers.
- (e) Transducers balancing, measurement of pressures, Calculations of gradients
- (f) Blood flows, cardiac output and Calculations of cardio shunts, resistances.
- (g) Management of patient in the Cath - Lab, coronary angiogram views.
- (h) Prerequisites of cat lab procedures: CBC, RFT, Serology, ECG, Echo, and customised list for all types of procedures.
- (i) Maintaining sterility, PPE - Personnel protective equipments.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Medical Emergency and Patient Care	3 0 1	4

Module-1

Introduction to Emergency Services

Organization of Emergency Department, Guidelines in Emergency, Clinical Monitoring, Fluid Therapy and Blood Transfusion, Airway Management, Cardiopulmonary Resuscitation, Principal of Mechanical Ventilation, Injection – An Infusion Method, Acid Base and Electrolyte Imbalance.

Module-2

Handling of Different Emergencies

Cardiogenic Shock, Congestive Cardiac Failure, Myocardial Infarction, Head Injuries, Vasovagal Syncope, Seizer, Epilepsy, Conjunctival and Corneal Foreign Body, Foreign Body in Nose & in Ear, Epistaxis, Asthma, COPD, Haemoptysis, Rib Fracture, Tear Gas Exposure, Food Poisoning, Diarrhea, Urine Retention, Blunt Scrotal Trauma, Hypo & Hyperthermia.

Module-3

Fundamentals of Patient Care

Concept of health & Illness, Health Determinants, Concept of Patients & Their Types, Patient Centred Care & Fundamentals of Communications, Reporting & Recording of Patients, Rights of Patients , Concepts of Disease & Its Types, General Concept, Care & Prevention of Accident, Trauma & Infections.

Module-4

Patient Care, Associated Units & Departments

Ambulatory Units, Critical Care Units ,Paediatric, Neonatal Intensive Care Unit (NICU), Emergency Department, Inpatient Units, Haematology/Oncology and Immunology Unit , Orthopaedic Unit, Psychiatry Unit ,Neurology and Neurosurgical Unit, Renal, Dialysis Unit, Gastroenterology/Endocrinology Unit,

Module-5

Life Flight Critical Care Transport Program, Radiology Department, Surgical Units, Cardiac Catheterization Lab, Operating Room, Post Anaesthesia Care Unit, Managing patients with disabilities, Geriatric Care, Care of Critically Ill Patients, Tracheotomise Patients. Nutritional Support in ICU. Ischemic Heart disease,Rheumatic Heart Disease,Cardiomyopathy.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Interpretation of Echocardiography	3 0 1	4

Module-1

Principles of colour Doppler and spectral Doppler and their applications,ECHO views ,ECHO windows
Obtaining Left ventricular images ,Echocardiographic measurements of all dimensions.

Module-2

Indications for echocardiography:

Assessment of anatomy
Assessment of etiology
Assessment of pathology
Assessment of physiology
Assessment of follow up of cardiac diseases
Technical pitfalls of echocardiography-Echo windows.

Module-3

Stress Echocardiography

Bubble contrast
Indication
Contra- Indication
Reporting test.

Module-4

Trans Oesophageal Echo cardiography

Views
Indication
Contra- Indication
Test report.

Module-5

Applied pathology Echo findings

- a) LV study (Simpsons method)
- b) Concentric LVH
- c) Eccentric LVH

- d) Biventricular Hypertrophy.
- e) Patent Ductus Arteriosus
- f) Atrial Septal Defect

Module-6

Ventricular Septal Defect, Co-arcuation of aorta, Single ventricular defect, Single atrial defect, Cor-Triatriatum, Tetralogy of Fallot, Pentalogy of Fallot, Ebstein's anomaly, Trans-position of great arteries
Tricuspid atresia.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Hospital Management	3 0 1	4

Module-1

Introduction to management & Organization: The evolution of Management, Definition and importance of Management. Planning – Organizing – staffing – Motivating – Leading – Controlling. Management of health care units (in brief).
Introduction to hospital staffing- Hospital staffing, administration, PACS, HIS, RIS, DICOM. Medical records and documentation.

Module-2

Legal & medical issues- Legal and Ethical issues towards patient rights, patient responsibility, legal concerns, History taking, patient monitoring, informed consent, mal-practice, patient privacy issues. Professional ethics and Code of conduct of radiographer. Medical legal issues (MLC).

Module-3

Planning and Management of Hospitals & Clinical Services.
Handling of patients Seriously ill and traumatized patients, visually impaired, hearing and speech impaired patients, mentally impaired patients/ psychologically issues, infectious patients, critical/trauma patients, pregnant patient, patient with implant. Handling of patient with life threatening diseases like HIV, STD, HBsAG, etc.

Module-4

Organization and administration of various clinical services; outpatient services. In-patient services, emergency services, operation theatres, ICU's and super specialty services
Departmental Safety & Infection Control Safety and hazards from material and electricity etc. Biomedical waste management and control. **Infection control** Skin care, donning of gowns, gloves, face masks, head caps, shoe covers. **Vitals signs-** Vital signs. How to measure vital signs.

Module-5

Anesthesia- Local anesthesia and general anesthesia, uses in hospital, Facilities regarding general Anesthesia in different department of hospital. Management of adverse **Body mechanics and transferring & shifting of patient** Draw sheet lift, use of slide boards, wheelchair to couch, couch to wheelchair, couch to table, three men lift and four men lift Orthodox & Austrian method etc. **First aid-** Artificial respiration, hemostasis, first aid techniques, ABCD management. National Programmes of Health and disease eradication .

Module-6

Storing & issuing, Concept of inventory control, Maintenance of equipment and contracts (with special reference to major biomedical equipment), National Programmes of Health and disease eradication / control . Individual behaviour in organization; organizational functioning (Group/Individual); Perception; Motivation MBO; Organizational Development.

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Basics Cardiac Evaluation	3 2 0	5

Module-1

Heart diseases and related disorders

- a) Ischaemic heart disease
- b) Rheumatic heart disease
- c) Congenital heart disease
- d) Arrhythmias
- e) Peripheral vascular disease
- f) Pericardial disease
- g) Pulmonary hypertension and embolism
- h) Shock state
- i) Cardiomyopathy
- j) Hypertension, diabetes, dyslipidaemias
- k) Infective endocarditis
- l) Heart failure

Module-2

Cardiovascular investigations: Noninvasive

- a) ECG - cardiac diagnosis by ECG: Chambers enlargement, arrhythmias, myocardial ischaemia and infarction.
- b) Echocardiography - cardiac diagnosis: valvular heart diseases, myocardial diseases, ischaemic heart diseases, Cardiomyopathies
- c) Pulmonary hypertension, infective endocarditis, intracardiac masses.
- d) Stress test- treadmill test review, pharmacological stress testing.
- e) Tilt table test
- f) Ankle-Brachial Index

Module-3

- a) Diagnosis of coronary artery disease
- b) Diagnosis of valvular heart diseases in the cath-lab - stenosis, regurgitation and mixed
- c) Diagnosis of shunts
- d) Evaluation of pulmonary hypertension
- e) Diagnosis of pericardial constriction
- f) Diagnosis of peripheral and aortic disease
- g) Complications of cardiac catheterization Complications and management of Contrast

Module-4

Cardiovascular interventional therapies

- a) Coronary angioplasty
- b) Peripheral angioplasty
- c) Mitral valvoplasty
- d) Pulmonary and aortic valvoplasty
- e) Device closures

- f) Pacemakers
- g) Pericardiocentesis
- h) Myocardial biopsy
- i) Retrieval of foreign bodies
- j) Clot aspiration

Module-5

Important Medical conditions and their relevance to cardiac care

- a) Anemia
- b) Renal failure
- c) Bleeding Diathesis
- d) Heart failure
- e) Hypoxia (cyanosis)

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Introduction to Cardiac Technology	3 2 0	5

Module-1

Introduction to coronary angiogram

- a) History of coronary angiography .
- b) Instrumentation in cath Lab.
- c) preparation of patient prior to the procedure.
- e) post procedure care.
- f) Drugs used in emergency during cath lab.
- g) Coronary blood circulation (arteries and veins)
- h) Anomalies in the origin of coronary arteries.
- i) Organization of cath lab services
- j) Data management of cath lab

Module-2

Electrocardiography

- a) Electrolyte disturbances and ECG deflections related to it.
- b) ECG changes involved in acute myocardial infarction
- c) Diagnoses of WPW syndrome
- d) ECG changes in left and right atrial enlargement.
- e) ECG changes in LVH and RVH , strain pattern, criteria.
- f) Changes in PR,QT,R-R interval .
- g) Tachycardia,Bradycardia ,irregular interval ECG changes.
- h) RBBB,LBBB, Fascicular block, bifascicular block, tri-fascicular block

Module-3

Echocardiography

- a) Types of transducers with it's significance.
- b) Doppler echocardiography ,Regional wall motion abnormality .
- c) Evaluation of systolic and diastolic Left ventricular functions.
- d) Normal chambers and dimensions
- e) Dilated cardiomyopathy
- f) Hypertrophic cardiomyopathy.

Module-4

Interpretation of Echo

Interpretation of ECG

Spotters-Materials and instruments used in cathlab and explaining

Tricuspid Stenosis

Tricuspid Regurgitation

Module-5

A) Restrictive cardiomyopathy

B) Pleural effusion

C) IVC collapse- IVC plethora, Hypoplastic IVC

D) Artefacts during echo

E) Echo approach during lung disorder

F) Trans-esophageal echocardiography –views, defects seen, indications, contra-indications bubble contrast .

G) Takotsubo cardiomyopathy

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Medical disorder & Incentive care	3 0 1	4

Module-1

Cardiac and Respiratory diseases

1. Cardio vascular diseases

a) Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias

b) Heart failure, shock - types, causes

c) Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS

2. Respiratory diseases

a) Pneumonia, tuberculosis,

b) Chronic obstructive pulmonary disease, asthma

c) Pleural effusion, pneumothorax

d) Interstitial lung disease

e) Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome

f) Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation,

g) mechanical ventilation, care of ventilated patient, complications and weaning.

Module-2

Neurological, Renal, GI and infectious diseases

3. Neurological diseases

a) Polio myelitis, Gullian Barre Syndrome, Myasthenia Gravis, epilepsy / seizure disorder, cerebro vascular accident / stroke

b) Head injury and Trauma Care: Glasgow coma scale, care of head injury patient, poly trauma patient

4. Renal Diseases

a) Acute kidney injury

b) Chronic Kidney Disease

c) Renal failure: types, etiology, complications, corrective measures

d) Urinary tract infections: Definition, types of UTI, risk factors, diagnosis, treatment

- e) Renal stone diseases, inherited and cystic renal diseases.
- f) Nephrotic syndromes- definition, clinical features, causes & types

5. Gastro intestinal and Liver Diseases

- a) Gastritis / APD, peptic ulcer
- b) Acute gastroenteritis
- c) Hepatitis, Hepatic failure, alcoholic liver disease

Infectious diseases: Dengue, malaria

Module-3

Blood, fluid, electrolyte and acid base abnormalities

Blood loss and Anemia,
thrombocytopenia Fluid and electrolyte disorders-

Hyponatremia, hypernatremia, hypokalemia & hyperkalemia: Etiology, clinical presentation and management

Disorders of calcium, phosphorous & magnesium ions. Acid- base disorders : Basics of ABG

Metabolic acidosis & metabolic alkalosis: pathophysiology, etiology , clinical features and management.

Module-4

Infection Control and Nutrition in ICU

Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome
Nutrition and Fluid balance - total parenteral nutrition, nasogastric tube,

Module-5

Health problems in Specific conditions and Toxicology –

Health problems in specific conditions

- a) Pregnancy - antenatal care, disorders in pregnancy
- b) Obesity
- c) Diabetes mellitus
- d) HIV infections and AIDS

Poisoning and drug over dosing

- A) Classification of poisons, Principles of treatment of poisoning and Primary care. Poisons and drug over dosing requiring ventilation,
- B) Drowning & Hanging

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Cardiac Evaluation	3 2 0	5

Module-1

Drugs and Nutrition in Cardiac Care

Drugs acting on cardiac system and emergency cardiovascular drugs

- a. Antiplatelets drugs
- b. Antiischaemic drugs
- c. Thrombolytic drugs
- d. Antiarrhythmic drugs

Nutrition assessment and management

Module-2

Patient monitoring in cardiac care

Monitoring of a patient with cardiac disease

- a) Cardiac Rhythm and rate.
- b) Trans-cutaneous oxygen monitors and Pulse oximeters.
- c) Invasive hemodynamic monitoring
- d) Multi parameter monitoring
- e) ACT monitoring
- f) Monitoring response to therapy and progression of disease

Module-3

Electrocardiography

Optimum recording of 12 leads ECG and computerised interpretation PR interval

QT interval

Calculation of heart rate

Analysis of ST segment

Chamber hypertrophy Acute

coronary syndromes

Bradyarrhythmia

Tachyarrhythmias Pericardial

diseases

Diagnoses of acute myocardial infarction Diagnoses of hyperkalemia

Diagnoses of WPW syndrome

ECG - Review of ECG patterns in ischaemic heart diseases, hypertensive heart disease Trouble shooting & Documentation of ECG artefacts.

Module-4

Stress test- treadmill test treadmill, bicycle and others

Indications/ contra indications, Complications

Preparation for treadmill test

Artefacts & documentation in treadmill ECG

Module-5

Holter monitoring

24 hours Holter monitoring

Ambulatory BP monitoring

Loop recorders

Defibrillators & CPR

Newer technologies for monitoring the patients with heart diseases

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Cardiac Therapies	3 0 2	5

Module-1

Echocardiography

Evaluation of left ventricular studies - 16 segment model, Evaluation of left ventricular studies - systolic and diastolic functions Evaluation of right ventricle, Echocardiography - A review of Evaluation of valvular heart diseases, ischaemic, heart diseases, Cardiomyopathies and pericardial diseases Basics of pediatric echocardiography., Echocardiography in acute rheumatic fever Echocardiography in chronic rheumatic heart disease Echocardiography in cardiac tamponade Echocardiography in Congenital heart diseases, Coarctation of aorta Pulmonary and aortic stenosis Tetralogy of Fallot, Transesophageal echocardiography, Stress echocardiography (pharmacological) 3D echocardiography

Module-2

Invasive techniques

Guide wires

Diagnostic catheters for coronary angiography

Diagnostic catheters for carotid, /cerebral angiography

Diagnostic catheters for renal angiography

Diagnostic catheters for abdominal vessels

Invasive techniques Procedures

Carotid and cerebral angiography

Renal angiography

Studies of abdominal aorta, mesenteric, iliac and others

Module-3

Care of patient undergoing vascular procedures

Indications, contraindications for angiographic studies

Patient education of the invasive procedures, consent processes and preparation

Monitoring physiological variables during cath lab procedures

Post procedure protocols

Reporting and data management of the cath procedures

Module-4

Pacemaker

Cardiac pacing indications

Cardiac anatomy and its importance in pacing

Cardiac pacing physiology

Cardiac pacing temporary
 Cardiac pacing permanent
 Programing of pacemakers
 Common problems associated with pacemakers.
 External cardiac pacing

Module-5

Basics of Nuclear cardiology

- A) Principles of nuclear cardiology
- B) Tracers used in nuclear cardiology
- C) Imaging techniques in nuclear cardiology
- D) Indications of nuclear diagnostic procedures in cardiology

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Clinical Cardiac Care tech	3 2 0	5

Module-1

- Cardiovascular investigations: Invasive
- Coronary angiography
 - Diagnosis of mitral stenosis, regurgitation and mixed
 - Diagnosis of shunts A review
 - Diagnosis of peripheral and aortic diseases
 - Complications of cardiac catheterization
 - Contrast induced nephropathy prevention and management.

Module-2

- Invasive technologies
- a) Coronary angiogram for performing angioplasty
 - b) PTCA
 - c) Coronary Stents
 - d) Optimizing the results of PTCA

Module-3

- Invasive technologies
- a) Intra-aortic balloon pump
 - b) Fractional flow reserve
 - c) Rotational atherectomy
 - d) Intra vascular ultrasound
 - e) Optical coherence tomography

Module-4

Invasive

- Organization of cath lab services
- Data management of cath lab
- Management of intra coronary thrombus Management of

hypotension Management of
 vasovagal attack Management of
 coronary perforation
 Management of retrieval of dislodged foreign materials in the vessels.

Module-5

VALVULAR HEART DISEASE –ECHOCARDIOGRAPHY

- a) Aortic Stenosis
- b) Mitral Stenosis
- c) Pulmonary Stenosis
- d) Tricuspid Stenosis
- e) Aortic Regurgitation
- f) Tricuspid Regurgitation
- g) Mitral Regurgitation
- h) Pulmonary Regurgitation
- i) RHD

Subject Code	Name of the Subject	T - P- Pj	Credits
CUTM	Coronary angiography	3 0 1	4

Module-1

Introduction to coronary angiogram History
 of coronary angiography Instrumentation in
 coronary angiography Indications for coronary
 angiography Contraindications for coronary
 angiography

Module-2

Procedure

Approach

Seldinger technique

Catheters for coronary angiography Views for coronary angiography.

Module3

Evaluation of a coronary lesion
 Reporting of coronary angiography
 Decision making on management
 Revascularization PTCA or CABG
 Planning review of protoco

Module-4

Post procedure care

Drugs

Groin care (femoral approach)

Wrist care (radial approach)

Complications and management

Module-5

Coronary artery disease

Congenital heart disease and other paediatric cardiac disorders

Pericardial diseases

Traumatic heart disease

Epidemiology and preventive cardiology

Holter monitoring for arrhythmias and ischemic disorders

INTERNSHIP THESIS GUIDELINE

This Guideline is designed to provide students the knowledge and practice of public health research activity, to enable them to carry out researches and solve research related problems and to help them in writing thesis and defend their work. Upon successful completion of the course, the students shall be able to:

1. Search relevant scientific literature
2. Develop a research proposal
3. Employ appropriate data collection techniques and tools
4. Manage collected data
5. Analyze data with appropriate statistical techniques
6. Write thesis
7. Defend the findings

Proposal Development:

At the ending of third year (Sixth Semester), students individually consultation with designated faculties and extensive literature survey will develop research proposal during the initial 6 months period.

Data Collection/ Thesis Writing:

Students will carry out data collection, data management, data analysis, and thesis writing during the remaining period (Six Semester).

The Dissertation should have following format:

1. Title
2. Introduction
3. Materials and Methods
4. Results
5. Discussion
6. Conclusion
7. Recommendation
8. References
9. Appendix

Subject Code	Name of the Subject	Credits
CUTM1779	Project	18

Project

work: -

Suggested Project title

1. A survey of radiation protection awareness in non-radiation workers.
2. An evaluation of accuracy of ultrasound in the detection of Hepatitis.
3. An assessment of depression among practicing radiographers in Andhra Pradesh.
4. Evaluation of radiation, protection, measure for female patients of child bearing age using many medical colleges in Andhra Pradesh as case study.

Subject Code	Name of the Subject	Credits
CUTM1780	Internship	18

Internship

1. Case record
2. Lab management and ethics
3. Evaluation -Guide(internal) -Industries guide(external)-University-project report/ Viva