

MEWAR UNIVERSITY

(A University u/s 2(f) & 12 (B) with right to confer degrees u/s 22(1) of the UGC Act 1956 and
Established by Rajasthan State Govt. Act No. 4 of 2009)

(NAAC ACCREDITED)

MEMBER, ASSOCIATION OF INDIAN UNIVERSITIES (AIU)

SYLLABUS

B. Sc. Cardiac Care Technology



University Campus: NH- 48, Gangrar, Chittorgarh, Rajasthan – 312901

Contact No.: 01471-285451/52/57/ (Reception) Toll Free: 180030707373

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FIRST YEAR

S.NO.	SUBJECT	DISTRIBUTION OF MARKS				
		THEORY	INTERNAL	PRACTICAL		TOTAL
				TH	INT	
1	Anatomy	80	20	40	10	150
2	Physiology	80	20	40	10	150
3	Biochemistry	80	20	40	10	150
4	Microbiology	80	20	40	10	150
5	Pathology	80	20	40	10	150
TOTAL		400	100	200	50	750

SECOND YEAR

S.NO	SUBJECT	DISTRIBUTION OF MARKS				
		THEORY	INTERNAL	PRACTICAL		TOTAL
				TH	INT	
1	Applied Microbiology And Pathology	80	20	40	10	150
2	Introduction to Cardiac care Technology	80	20	40	10	150
3	Applied Pharmacology	80	20	40	10	150
4	Medicine relevant to Cardiac care technology	80	20	40	10	150
5	Psychology And Sociology	80	20	40	10	150
6	Bio medical west	80	20	-	-	100
TOTAL		480	120	200	50	850

THIRD YEAR

S.NO	SUBJECT	DISTRIBUTION OF MARKS				
		THEORY	INTERNAL	PRRACTICAL		TOTAL
				TH	INT	
1	Cardiac Care Technology Clinical	80	20	-	-	100
2	Cardiac Care Technology Applied	80	20	40	10	150
3	Cardiac Care Technology Advance	80	20	40	10	150
4	Research And Biostatics	80	20	-	-	100
5	Computer Application And Data Base Management	80	20	40	10	150
TOTAL		400	100	120	30	650

FORTH YEAR

Course Code	Course TITLE	Contact hour Per week (P)	Credit	Internal Assessments /Evolution		External Examination/viva-voce	Total Marks
				Training report	Teachers Evolution		
BCCT 401	Hospital Training	40	20	150	100	250	500
BCCT 402	Comprehensive academic and general viva voce	-	2	-	-	50	50

ANATOMY

UNIT-1ST:

1. Introduction: Human Body as a Whole:

Definition of anatomy and its divisions; Terms of location, positions and planes Cell and its organelles; Epithelium-definition, classification, describe with examples, function.

Glands- classification, describe serous & mucous glands with examples;

Basic tissues–classification with examples.

2. Locomotion and support

Cartilage – types with example & histology; Bone – Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, intervertebral disc, fontanelles of fetal skull; Joints – Classification of joints with examples, synovial joint (in detail for radiology); Muscular system: Classification of muscular tissue & histology; Names of muscles of the body.

3. Cardiovascular system

Heart-size, location, chambers, exterior & interior Blood supply of heart, Systemic & pulmonary circulation, Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, Peripheral pulse Inferior venacava, portal vein, portosystemic anastomosis, Great saphenous vein Dural venous sinuses, Lymphatic system- cisterna chyli & thoracic duct, Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief

4. Gastro-intestinal system:

Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring), Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas, Radiographs of abdomen.

UNIT-2ND:

5. Respiratory system:

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments

Histology of trachea, lung and pleura, Names of paranasal air sinuses

6. Peritoneum: Description in brief

7. Urinary system: Kidney, ureter, urinary bladder, male and female urethra, Histology of kidney, ureter and urinary bladder

8. Reproductive system

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology), Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology) Mammary gland – gross,

UNIT-3RD:

9. Endocrine glands:

Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid

gland, suprarenal gland – (gross & histology)

10. **Nervous system**

Neuron, Classification of NS, Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology), Meninges, Ventricles & cerebrospinal fluid Names of basal nuclei, Blood supply of brain, Cranial nerves, Sympathetic trunk & names of parasympathetic ganglia

11. **Sensory organs:**

Skin: Skin-histology, Appendages of skin

Eye: Parts of eye & lacrimal apparatus, Extra-ocular muscles & nerve supply

Ear: parts of ear- external, middle and inner ear and contents

12. **Embryology:**

Spermatogenesis & oogenesis, Ovulation, fertilization, Fetal circulation Placenta

REFERENCE BOOKS

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill
2. Chaurasia –A Text book of Anatomy T.S. Ranganathan – A text book of Human Anatomy
3. Fattana, Human anatomy (Description and applied) Saunder's & C P Prism Publishers, Bangalore – 1991
4. ESTER . M. Grishcimer, Physiology & Anatomy with Practical Considerations, J.P. Lippin Cott. Philadelphia

PHYSIOLOGY

UNIT-I:

1. Cell : Definition ,Structure and functions the cytoplasmic Organelles
Reproduction Meiosis, Mitosis The important physico-chemical laws
applied to physiology Diffusion , Osmosis , Bonding , Filtration
,Dialysis , Surface Tension , Adsorption ,Colloid

2. Physiology of different types of tissue: Epithelial tissue , Muscular
tissue,Nervouse tissue

1. LYMPH & CARDIOVASCULAR SYSTEM:

Lymph–lymphoid tissue formation, circulation, composition and function of lymph,

Cardiovascular system: Heart – Physiological Anatomy, Nerve supply, Properties of Cardiac muscle,
Cardiac cycle-systole,diastole. Intraventricular pressure curves. Cardiac Output – only definition, Heart
sounds Normal heart sounds Areas of auscultation. Blood Pressure – Definition, normal value, clinical
measurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock,
hypotension, hypertension. Pulse – Jugalar, radial pulse, Triple response, Heart sounds – Normal heart
sounds, cause characteristics and signification. Heart rate Electrocardiogram (ECG) –significance.

2. DIGESTIVE SYSTEM

Digestive System- Physiological anatomy of Gastro intestinal tract, Functions of digestive system, Salivary
glands Stucture and functions. Deglutination –stages and regulation. Stomach – structure and fuctions,
Gastric secretion – Composition function regulation of gastric juice secretion, Pancrease – structure,
function, composition, regulation of pancreatic juice, Liver – functions of liver, Bile secretion, composition,
function regulation of bile secretion .Bilirubin metabolism, types of bilirubin, Vandernberg reaction,
Jaundice- types, significance. Gall bladder–functions, Intestine – small intestine and large intestine,Small
intestine–Functions- Digestive, absorption ,movements. Large intestine–Functions, Digestion and
absorption of Carbohydrates,Proteins, Fats,Lipids.Defecation

UNIT-2nd:

3. RESPIRATORY SYSTEM:

Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract,
Respiratory Muscles, Respiratory organ-lungs, Alveoli, Respiratory membrane, stages of respiration.
Mechanism of normal and rigorous respiration. Forces opposing and favoring expansion of the lungs. Intra
pulmonary pleural pressure, surface tension, recoil tendency of the wall. H-Transportation of Respiratory
gases:Transportation of Oxygen : Direction, pressure gradient, Forms of transportation, Oxygenation of Hb.
Quantity of Oxygen transported. Lung volumes and capacities, Regulation of respiration what? Why? How?
Mechanisms of Regulation, nervous and chemical regulation. Respiratory centre. Hearing Brier, Reflexes.
Applied Physiology and Respiration: Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial
Respiration, Apnoea.

4. ENDOCRINE SYSTEM

Definition Classification of Endocrine glands & their Hormones, Properties of Hormones.

Thyroid gland hormone—Physiological, Anatomy, Hormone secreted, Physiological function, regulation of secretion. Disorders – hypo and hyper secretion of hormone Adrenal gland, Adrenal cortex physiologic anatomy of adrenal gland, Adrenal cortex, cortical hormones— functions and regulation, Adrenal medulla – Hormones , regulation and secretion. Functions of Adrenaline and nor adrenaline, Pituitary hormones— Anterior and posterior pituitary hormones, secretion, function, Pancreas—Hormones of pancreas, Insulin— secretion, regulation, function and action Diabetes mellitus—Regulation of blood glucose level, Parathyroid gland—function, action, regulation of secretion of parathyroid hormone. Calcitonin—function and action Special senses, Vision— structure of eye. Function of different parts. Structure of retina, Hearing structure and function of ear mechanism of hearing ,Taste –Taste buds functions . Smell physiology, Receptors.

UNIT-3rd:

5. NERVOUS SYSTEM

Functions of Nervous system, Neurone structure, classification and properties. Neuroglia, nerve fiber, classification ,conduction of impulses continuous and saltatory.Velocity of impulse transmission and factors affecting. Synapse – structure, types, properties. Receptors—Definition, classification ,properties. Reflex action—unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Ascending tracts, descending tracts—pyramidal tract –Extrapyramidal tracts. Functions of Medulla, pons, Hypothalamic disorders. Cerebral cortex lobes and functions, Sensory cortex, Motor cortex,Cerebellum functions of Cerebellum.Basal ganglion-functions. EEG. Cerebro Spinal Fluid (CSF) : formation, circulation, properties, composition and functions lumbar puncture. Autonomic Nervous System: Sympathetic and parasympathetic distribution and functions and comparison of functions.

6. EXCRETORY SYSTEM

Excretory organs, Kidneys: Functions of kidneys structural and functional unit nepron, vasarecta, cortical and juxtamedullary nephrons – Comparision, Juxta Glomerular Apparatus –Structure and function. Renal circulation peculiarities. Mechanism of Urine formation : Ultrafiltration criteria for filtration GFR, Plasma fraction, EFP, factors effecting EFR. Determination of GFR selective reabsorption—sites of reabsorption ,substance reabsorbed, mechanisms of reabsorption Glucose, urea. H+Cl aminoacids etc. TMG, Tubular load, Renal threshold % of reabsorption of different substances, selective e secretion. Properties and composition of normal urine, urine output. Abnormal constituents in urine , Mechanism of urine concentration. Counter—Current Mechanisms: Micturition, Innervation of Bladder, Cysteurethrogram. Diuretics:Water, Diuretics, osmotic diuretics,Artificial kidney Renal function tests—plasma clearance Actions of ADH, Aldosterone and PTH on kidneys. Renal function tests

7. REPRODUCTIVE SYSTEM

Function of Reproductive system, Puberty, male reproductive system. Functions of testes, spermatogenesis site, stages, factors influencing semen. Endocrine functions of testes Androgens— Testosterone structure and functions. Female reproductive system.Ovulation, menstrual cycle.

Physiological changes during pregnancy, pregnancy test. Lactation: Composition of milk factors controlling lactation. Muscle nerve physiology Classification of muscle, structure of skeletal muscle, Sarcomere contractile proteins, neuromuscular junction. Transmission across, Neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue Rigour mortis Skin -structure and function Body temperature measurement, Physiological variation, Regulation of body Temperature by physical chemical and nervous mechanisms. Role of Hypothalamus, Hypothermia and fever.

REFERENCE BOOKS:

1. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism publishers
2. Chatterjee(CC) Human Physiology Latest Ed., Vol-1, Medical Allied Agency
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,
4. Ganong (William F) Review of Medical Physiology. Latest Ed . Appleton

BIOCHEMISTRY

Unit I

General role and introduction of biochemist, ethics, responsibility, safety measures and first aid; Cleaning and care of general laboratory glassware.

.Instruments (Principal, care and instrumentation) : Water bath: Oven & Incubators Water Distillation plant and water deionisers. Use, care and maintenance Refrigerators, cold box, deep freezers .Reflux condenser: Centrifuges ,Laboratory balances , pH meter ,Colorimeter and spectrophotometer.

Unit II

Measurement unit: SI, MKS, & CGS ,Solution : Introduction types and preparation . Molarity, Normality , Molar, Normal & percent solution .

3. Saturated and supersaturated solutions: Standard solutions. Significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, Preparation of standard solutions of deliquescent compounds

Unit III

1. Atomic structure

Dalton's theory, Properties of electrons, protons, neutrons, and nucleus, Rutherford's model of atomic structure, Bohr's model of atomic structure, orbit and orbital, Quantum numbers, Molecular weight, equivalent weight of elements and compounds.

2. Radioactive isotope: Radioactivity, Half Life, Solution : Introduction types . Molarity, Normality , Molar, Normal & percent solution .

3. pH Definition, Regulation in body and Disturbance in acid Base Balance Anion Gap. Basic Principles and estimation of Blood Gases and pH

Unit V : Introduction of Macromolecules and Metabolism : Structure, Function and Metabolism of Carbohydrates, Lipid, and Protein. Enzymes: Introduction and function, Vitamins: sources, functions, deficiency, requirements, Nucleic acid: Structure, function, type .

Unit V

Vitamins and Minerals: Fat soluble vitamins (A, D, E, and K); water soluble vitamins: B-complex vitamins; principal elements (Calcium, phosphorus, magnesium, potassium, chlorine and sulphur); trace elements; calorific value of foods; basal metabolic rate (BMR); respiratory quotient (RQ) specific dynamic action (SDA); balanced diet – Marasmus and Kwashiorkor

PATHOLOGY

Unit I

Introduction of cell adaptation , ,Neoplasia, Cell injury and adaptation, Atrophy, Hypertrophy, Metaphase, Hyperplasia, Classification of tumors, Premalignant lesion. Disorders of vascular

flow & shock (Brief introduction), Oedema, Hyperemia or Congestion, Thromboses, Embolism, Infarction shock, Ischemia, Over hydration and Dehydration.

Unit: II

Introduction of, Immune defense Infection - The Response to infection, Categories of infectious agents, Host barriers to infection, How disease is caused, Inflammatory response to infectious agents.

Hematopoietic and Lymphoid System, Hemorrhage, Various type of Anaemia, Leucopenia, Leucocytosis, Bleeding disorders coagulation mechanism.

Unit III

Cardiology and Pathology: Circulatory Hypertension, Coronary Artery Disease, Arrhythmias, Cardiac Arrest, Shock, Deep Vein thrombosis (DVT), ECG, 2D Echo Cardiogram, Coronary Angiography, Cardiac Catheterization, Stress test, Pacemaker, Renal, Nephrotic Syndrome.

Peripheral Vascular Disease: Atherosclerotic peripheral vascular disease, Aortic aneurysms, Aortic dissection, Takayasu arteritis, Circulatory disorders

Unit IV: **Pathology of the Cardiovascular System:** Understand common pathological terms used in the description of heart disease and application; Associated electrocardiographic features; Knowing the meaning of the terms- Atherosclerosis, Atheroma, Ischaemia, Angina pectoris,

Unstable angina, Prinzmetal's angina, ST-elevation and non-ST elevation myocardial infarction, Acute coronary syndrome, necrosis, Hypertension, Atrial and Ventricular septal defects, Cyanosis, Pericarditis.

Microbiology

Unit I

Introduction to Microbiology: Meaning & definition of microbiology; Brief history of microbiology & contribution by Antony Van Leeuwenhoek, Robert Koch & Louis Pasteur in the field of microbiology ; Organism included in the study of microbiology; Meaning & definition of microorganism and its types; Brief overview of diseases caused by Microorganism.

Unit II

Cell Structure & Function: Definition, structure and function of cell; Types of cells- prokaryotic & eukaryotic cells; Structure and function of eukaryotic & prokaryotic cell; Classification of microorganisms, size, shape and structure of bacteria, Gram positive and Gram negative cell wall .

Unit III

Common Equipment Used in Microbiology lab (Principal and use) , Incubator water bath, Hot Air Oven, Laminar Air Flow, Anaerobic Jar , Centrifuge , Microscope.

Sterilisation and Disinfection:

Principles and use of equipments of sterilization namely Hot Air oven, Autoclave and serum inspissator. Pasteurization, Anti septic and disinfectants. Antimicrobial sensitivity test

Unit IV

Immunology:

Immunity Vaccines, Types of Vaccine and immunization schedule, Principles and interpretation of commonly had done serological tests namely. Hospital Waste Management types of hospital waste and their treatment.

Unit V:

Introduction of collection & transportation of specimen; Rules for collection & transportation of specimen.

Method of collecting different types of the Microbial Sample from various anatomical site and their transport , Swab and their types

SECOND YEAR

APPLIED MICROBIOLOGY AND PATHOLOGY

UNIT I

Health care associated infections and Antimicrobial resistance: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostridium difficile, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associated infection.

UNIT II

. Disease communicable to Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory syncytial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route (Salmonella, Hepatitis A etc), direct contact (Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.

Microbiological surveillance and sampling: Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis and also to assess the antimicrobial resistance.

Sampling: rinse technique, direct surface agar plating technique.

UNIT III

CARDIOVASCULAR SYSTEM

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms - Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy - causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy - Definition, Types, causes and significance.
- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases - Basic defect and effects of important types of congenital heart Diseases

UNIT IV

RESPIRATORY SYSTEM

- Chronic obstructive airway diseases - Definition and types. Briefly causes, Pathology and complications of each type of COPD.
- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion - causes, effects and diagnosis.

RENAL SYSTEM

- Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease - Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

INTRODUCTION TO CARDIAC CARE **TECHNOLOGY**

UNIT: I

I. Electrocardiography (ECG)

Basic Principles , The Electrocardiographic paper , The Electrocardiograph

The Electrical field of Heart , The leads: Standard limb, Precardial lead, 'V' lead & 'AV' lead

Basic ECG deflections , Basic action of electrocardiograph

Normal EG The 'P' wave , The 'qrs' complex ,The genesis of 'qrs' complex , T wave; the S-T segment

The 'U' wave Rate & rhythm

So called rotation of the heart - The Q-T interval

. The Electrical axis , Precardial pattern of ECG , Chamber enlargement - atrial enlargement, LV hypertrophy & RV hypertrophy , Sundle branch block

General principles Right Bundle branch block , Left bundle branch block ,The Hemi blocks (Fasicular block).

UNIT : II

II. Exercise stress Testing

Exercise, Exercise protocols, . Electrocardiography measurements

4. Exercise testing - Indication and techniques

Echocardiography

Principles of Echocardiography, Basic principles of ultrasound , M-Mode of Echocardiography

Two dimensional Echocardiography

UNIT III

• Doppler Echocardiography; color flow

• Transoesophageal Echocardiography

Instrumentation

• Basic pulse Echo system

• Transducers

• Pulse generation

• Echo detection

• A mode, B-Mode, M-Mode

• Display & recording

Echocardiographic Examination

• Selecting transducers

• Position of the patient

• Placement of the transducer

• Setting control

• M-Mode labelling

• 2 D Echo

• Normal variants

• Terminology

• Identification of segments

UNIT IV

. Doppler Echocardiography

a. Introduction to Doppler color Echocardiography

The Doppler principles

Doppler ultrasound techniques

Color Doppler flow imaging

Clinical application of Doppler Echocardiograph

b. Physical principles & instrumentation in spectral & color Doppler flow imaging

c. Physical principles and Doppler effect. The Doppler Echocardiography system display

- d. Blood flow pattern - Laminar & non-laminar flow
- e. Doppler Echo cardiograph modes
 - Continuous wave Doppler system
 - Pulsed Doppler system
 - High pulse repetition frequency
 - Problems of color imaging
 - Contrast Echo
 - Echo measurements-'ASE' recommendation

APPLIED PHARMACOLOGY

UNIT I

- General concepts about pharmacodynamic and Pharmacokinetic Principles involved in drug activity.

Autonomic nerves system. : Anatomy & functional organisation.,List of drugs acting an ANS including dose, route of administration, indications, contra indications and adverse effects.

Cardiovascular drugs- Enumerate the mode of action, side effects And therapeutic uses of the following drugs.. Antihypertensives(Beta Adrenergic antagonists, Alpha Adrenergic antagonists , Peripheral Vasodilators, Calcium channel blockers), Antiarrhythmic drugs

Cardiac glycosides, Sympathetic and nonsympathetic inotropic agents., Coronary vasodilators.

. Antianginal and anti failure agents, Lipid lowering & anti atherosclerotic drugs.. Drugs used in Haemostais - anticoagulants Thrombolytics and antithrombolytics. Cardioplegic drugs- History, Principles and types of cardioplagia.,. Drugs used in the treatment of shock.

UNIT II Anaesthetic agents.

- Definition of general and local anaesthetics.
- Classification of general anaesthetics.
- Pharmacokinetics and Pharmacodynamics of inhaled anaesthetic agents.
- Intravenous general anaesthetic agents.
- Local anaesthetics - classification mechanism of action, duration of action and methods to prolong the duration of action. Preparation, dose and routes of administration. Analgesics
- Definition and classification
- Routes of administration, dose, frequency of administration,
- Side effects and management of non opioid and opioid analgesics

UNIT III : Antihistamines and antiemetics- Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.,. CNS stimulants and depressants

- Alcohol, Sedatives, hypnotics and narcotics
- Neuromuscular blocking agents and muscle relaxants.

Pharmacotherapy of respiratory disorders

- Introduction - Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone
- Pharmacotherapy of bronchial asthma
- Pharmacotherapy of cough
- Mucokinetic and mucolytic agents
- Use of bland aerosols in respiratory care.

UNIT IV

Corticosteroids - Classification, mechanism of action, adverse effects and complications.

Preparation, dose and routes of administration.

Diuretics, Side of action of diuretics, Adverse effects , Preparations, dose and routes of administration., Combination of antimicrobial agents , Chemoperophylaxis.

- Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol, antitubercular drugs. Miscellaneous. IV fluids- various preparations and their usage. Electrolyte supplements.
- Drugs used in metabolic and electrolyte imbalance.

MEDICINE RELEVANT TO CARDIAC CARE TECHNOLOGY

Cardiovascular System
 Ischaemic heart diseases
 Rheumatic heart disease
 Congenital heart disease
 Hypertension
 Aortic Aneurysms
 Cardiomyopathy
 Peripheral vascular disease
 Pulmonary edema and LV failure
 Hematology
 Anaemia
 Bleeding disorders
 Laboratory tests used to diagnose bleeding disorders (in brief)
 Respiratory System
 Chronic obstructive airway diseases (COPD)
 Concept of obstructive versus restrictive pulmonary disease
 PFT and its interpretation
 Renal System
 ARF & CRF
 End stage renal disease
 Role of dialysis and renal transplantation in its management
 CNS
 Automatic nervous system
 (Sympathetic & Parasympathetic system)
 Brief mention of CNS disorders & their etiology
 Others
 DM
 Obesity
 Pregnancy
 Paediatric Patient (neonate/Infant)
 Elderly

INTRODUCTION TO CARDIAC CARE TECHNOLOGY

UNIT: I

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Basic Principles , The Electrocardiographic paper , The Electrocardiograph

The Electrical field of Heart , The leads: Standard limb, Precordial lead, 'V' lead & 'AV' lead

Basic ECG deflections , Basic action of electrocardiograph

Normal ECG The 'P' wave , The 'qrs' complex ,The genesis of 'qrs' complex , T wave; the S-T segment
The 'U' wave Rate & rhythm
So called rotation of the heart - The Q-T interval
. The Electrical axis , Precardial pattern of ECG , Chamber enlargement - atrial enlargement, LV hypertrophy & RV hypertrophy , Sundle branch block
General principles Right Bundle branch block , Left bundle branch block ,The Hemi blocks (Fasicular block).

UNIT : II

II. Exercise stress Testing

Exercise, Exercise protocols, . Electrocardiography measurements

4. Exercise testing - Indication and techniques

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Principles of Echocardiography, Basic principles of ultrasound , M-Mode of Echocardiography

Two dimensional Echocardiography

UNIT III

- Doppler Echocardiography; color flow

- Transoesophageal Echocardiography

Instrumentation

- Basic pulse Echo system

- Transducers

- Pulse generation

- Echo detection

- A mode, B-Mode, M-Mode

- Display & recording

Echocardiographic Examination

- Selecting transducers

- Position of the patient

- Placement of the transducer

- Setting control

- M-Mode labelling

- 2 D Echo

- Normal variants

- Terminology

- Identification of segments

UNIT IV

. Doppler Echocardiography

a. Introduction to Doppler color Echocardiography

The Doppler principles

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Clinical application of Doppler Echocardiograph

b. Physical principles & instrumentation in spectral & color Doppler flow imaging

c. Physical principles and Doppler effect. The Doppler Echocardiography system display

d. Blood flow pattern - Laminar & non-laminar flow

e. Doppler Echo cardiograph modes

- Continuous wave Doppler system

- Pulsed Doppler system

- High pulse repetition frequency

- Problems of color imaging

Contrast Echo

Echo measurements-'ASE' recommendation

PSYCHOLOGY & SOCIOLOGY

This course will enable the students to understand specific Psychological factors and effect in physical illness and this will help them to have a holistic approach in their dealing with patients during admission, treatment, rehabilitation and discharge.

Course contents: - all sections carry equal weightage

PSYCHOLOGY

(PART A)- Unit 1

1. What is psychology? Fields of application of psychology, influence of heredity and environment on the individual?

2. Learning- theories and principals?
3. Memory, forgetting, theories of memory and forgetting, thinking and methods to improve memory?
4. Motivation- theories and types of motivation?
5. Emotions- Theories of emotions and stress?
6. Intelligence – introduction and theories of intelligence?
7. Personality, theories of personality, factors influencing personality?

(PART B)- Unit 2

8. Behaviour- Normal and Abnormal behaviour?
9. Counselling- Definitions, Aims and Principals?
10. Psychotherapy- Brief introduction to paradigm in psychopathology and therapy?
11. Anxiety Disorders- Phobias, Panic, Generalized anxiety disorders and Obsessive Compulsive disorders?
12. Personality disorders, mood disorders, psychosis and mental retardation?
13. Project report and Viva voice

SOCIOLOGY

(PART A)- Unit 3

1. Meaning, Definitions and scope of Sociology?
2. Its relation with Psychology, Social Psychology and Anthropology?
3. Methods of sociology- Case study, Social Survey, Questionnaire, interview and opinion poll methods?
4. Importance of its study with special reference to health care professionals?
5. Social change – meaning, factors of social change, social planning to improve health and rehabilitation services?
6. Social factors in health and disease- meaning and role?

(PART B)- Unit 4

7. Socialization- meaning, nature, types and agencies of Socialization?
8. Social groups - meaning, definitions and importance?
9. Family- meaning, definitions and importance?
10. Social Problems- Population explosion, poverty and alcoholism
11. Prostitution and problems of women in employment?
12. Social Worker- Meaning, importance and role of a medical social worker?

BIO MEDICAL WEST

UNIT 1 INTRODUCTION & WASTE SEGREGATION

General Introduction, Definition of Biomedical Waste, General and Hazardous health care waste – Colour Coding and types of containers for disposal of medical waste, Segregation, Collection & Disposal.

UNIT 2 TYPES OF BIOMEDICAL WASTE

Infectious waste, Genotoxic waste, Waste Sharps – Categories, Categorization and composition of Biomedical waste. Liquid Biomedical Waste - Radioactive wastes, Metals, Chemicals & drugs

UNIT 3 HOSPITAL GENERATED WASTE

Human Blood and Blood Products, pathological wastes, Contaminated sharps, Contaminated animal carcasses, body parts, and bedding Basic information about infection, Infectious agents on organizations spread of infection, Basic information about Hospital acquired infection.

UNIT 4 TYPES OF WASTE DISPOSAL

Disinfections unit container for Autoclaving, Sharp waste containers for storage & transportation, autoclaving, Incineration, Plasma Pyrolysis /Gasification systems, Composting.

UNIT 5 BIOETHICS AND RECENT TRENDS

Modern Technology for handling Biomedical Wastes – Monitoring & Controlling of Cross Infections, Protective Devices – Bioethics and Handling of Waste Management.
Max. 45 Hours

THIRD YEAR

Cardiac Care Technology – Clinical

UNIT : I

1. Interpretation of Normal ECG and Basic abnormalities of ECG in RHD, IHD & CHD
2. Echo in rheumatic heart disease - Echo in mitral stenosis, mitral incompetence, aortic stenosis, aortic incompetence, pulmonary hypertension. Post AVR, post MVR. Prosthetic valve malfunction, LA clot.
3. Echo in congenital heart disease - Echo in ASD, VSD, PDA pulmonary stenosis, aortic stenosis, contraction of aorta, TOF. dextrocardia.

UNIT: II

- . Echo in ischemic heart disease - Echo in acute myocardial infarction, old myocardial infarction and other ischemic heart disease related conditions, LV aneurysm
- Echo in other cardiovascular disease- Echo in various types of cardio myopathy infective endocardities diseases of aorta, mitral valve prolapse, myxoma and other cardiovascular diseases.
- . Assessment of Cardiac function- measurements of all cardiac chambers and assessment of cardiac function
- . Echo in pericardial disease- pericardial effusion, cardiac tamponade, constrictive pericarditis

UNIT III

8. Cardiac catheterisation laboratory - general details of cardiac catheterisation equipment, how to handle the machine, common problems one may come across and how to overcome it, radiation hazards
9. Materials used in the cathlab- all catheters, balloons, guidewires, pacemakers contrast material and other material used in the cardiac catheterisation laboratory and sterilization of all these materials
10. Right heart catheterisation - procedure, cath position, oxymetry at various levels, angios done and

its interpretation

UNIT IV

Left heart catheterisation - procedure, cath position, oxymetry at various levels, angios done and its interpretation

. Coronary angiogram - procedure, materials used, type and amount dye used, indications and

contraindications, various pictures recorded in various angles and gross interpretation.

. Peripheral angiogram - procedure, indication and contraindication

Cardiac Care Technology – Applied

UNIT :I

1. ECG in myocardial infarction- definition of myocardial infarction, diagnosis of myocardial

infarction, ECG criteria for myocardial infarction, ECG in anterior wall, inferior wall, true posterior

wall and sub endocardial infarction and RV infarction

2. ECG in rheumatic heart disease - definition of rheumatic heart disease, valvular involvement in

rheumatic heart disease, ECG in mitral stenosis, mitral incompetence, aortic stenosis and aortic

incompetence

3. ECG in hypertension- definition of hypertension, how to record blood pressure, ECG in

Hypertension

UNIT : II

4. ECG in congenital heart disease- common congenital heart disease ASD, VSD, PDA, pulmonary

stenosis, aortic stenosis, coarctation of aorta, TOF, definition of all these conditions , ECG changes

in all these conditions

5. ECG in other conditions - ECG in various types of cardiomyopathy, myxoedema, pericardial

effusion, acute pericarditis and other vascular diseases. Bundle branch block, WPW syndrome, dextrocardia

UNIT III

6. Trans esophageal echocardiogram - indications, procedure, usefulness and complications one

may encounter and its management

7. Stress Echo- procedure and indications

8. Peripheral Doppler - Procedure and usefulness of peripheral Doppler

9. Coronary angioplasty-procedure, materials used, complication one may encounter and how to manage it

UNIT:IV

10. Peripheral angioplasty - materials used and procedure. Angioplasty of coarctation of aorta

11. Fetal echocardiogram - Procedure, basic interpretation

12. Contrast echocardiogram - procedure and usefulness of contrast echocardiogram

13. Myocardial contrast echo- Basic knowledge

Cardiac Care Technology – Advanced

UNIT: I

1. Cardiac Monitoring - definition, purpose of cardiac monitoring, how to Recognise various

arrhythmias how to set up a intensive coronary care unit and usefulness of ICCU

2. Interpretation of TMT report - criteria for TMT positive test contraindication for TMT conditions

where TMT is not useful, complications that may occur in TMT room and its management

3. Use of defibrillator- indications, how to use the defibrillator, complications during the procedure and its management

4. Management of cardiac arrest - definition, causes external cardiac massage, artificial respiration

and other drugs and procedures used in the management of Cardiac arrest

5. Myocardial perfusion scan - procedures and usefulness of myocardial perfusion scan

UNIT II

6. Cardiac arrhythmias - bradyarrhythmia and tachy arrhythmias and ECG diagnosis of all rhythm disturbances. Sinus arrhythmia, APC, FPC, VPC, VF, VT, AF, SVT, IOHB, IIIOHB, complete heart block

7. Electrolyte disturbances - ECG in hypokalemia, hyperkalemia etc.,

8. Holter monitoring - procedure and usefulness

9. Valvoplasties- procedure, indications, complications and treatment of ballons, mitral

valvuloplasty, ballon aortic valvuloplasty ballon pulmonary valvuloplasty and balloon tricuspid valvuloplasty.

10. Coil closure and device closure of PDA - procedure, indications and materials used for coil and device closure of PDA

UNIT:III

11. Device closure of ASD - procedure, indications and materials used for device closure of ASD

12. Device closure of VSD - procedure, indications and materials used for device closure of VSD

13. Electrophysiological studies - basic knowledge of EP studies mapping and ablation

14. Oxymetry - handling of the instrument and usefulness of the instrument, normal and abnormal values.

15. Pressure recording- handling of the instrument and pressures in various chambers, normal and abnormal values

UNIT:IV

Temporary and permanent pacing - materials used, procedure, complications one may encounter

and management. Implantable Cardioverter defibrillator devices

17. CD recording and storage- recording and storage of all the procedures over CD

18. Procedure during pregnancy- precautions to be followed.
19. Nuclear Cardiology - instrumentation, radiopharmaceuticals, patient imaging techniques.

RESEARCH & BIO STATISTICS

Unit I

Introduction to basic statistical concepts: methods of statistical analysis and interpretation of data

Behavioural Objectives: Understands statistical terms.

Possesses knowledge and skill in the use of basic statistical and research methodology

Unit II

Introduction, Meaning, definition, characteristics of statistics. Importance of the study of statistics.

Branches of statistics. Statistics and health science including nursing. Parameters and estimates. Descriptive and inferential statistics. Variables and their types. Measurement scales

Unit III

Tabulation of Data, Raw data, the array, frequency distribution. Basic principles of graphical representation.

Types of diagrams - histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

Measure of Central Tendency Need for measures of central tendency

Unit IV

Measure of Variability, Need for measure of dispersion. The range, the average deviation, The variance and standard deviation. Calculation of variance and standard deviation ungrouped and grouped. Properties and uses of variance and SO.

Definition and calculation of mean - ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped. Meaning and calculation of mode. Comparison of the mean, and mode. Guidelines for the use of various measures of central tendency.

Unit V

Probability and Standard Distributions. Meaning of probability of standard distribution. The

Binominal distribution. The normal distribution. Divergence from normality - skewness, kurtosis.

Sampling Techniques. Need for sampling - Criteria for good samples. Application of sampling in Community.

Unit VI

Procedures of sampling and sampling designs errors. Sampling variation and tests of significance.

Health Indicator Importance of health Indicator. Indicators of population, morbidity, mortality, health services. Calculation of rates and ratios of health

Computer application & Database Management

Teaching Hours: 40

Unit I

The course enables the students to understand the fundamentals of computer and its applications. Introduction to Data processing

Unit II

Features of computers, Advantages of using computers. Getting data into / out of computers. Role of computers. What is Data processing? Application areas of computers involved in Data processing. Common activities in processing. Types of Data processing, Characteristics of information. What are Hardware and Software?

Unit III

Hardware Concepts, Architecture of computers, Classification of computers, Concept of damage. Types of storage devices. Characteristics of disks, tapes, Terminals, Printers, Network. Applications of networking concept of PC System care, Floppy care, Data care. Concept of Software.

Unit IV

Classification of software : System software. Application of software. Operating system. Computer system. Computer virus. Precautions against viruses. Dealing with viruses. Computers in medical electronics

Basic Anatomy of Computers Principles of programming

Computer application - principles in scientific research ; work processing, medicine,

libraries, museum , education, information system.

Data processing, Computers in physical therapy - principles in EMG, Exercise testing equipment,
Laser.

Scheme of Examination for *MEDICAL ELECTRONICS including COMPUTERAPPLICATION*