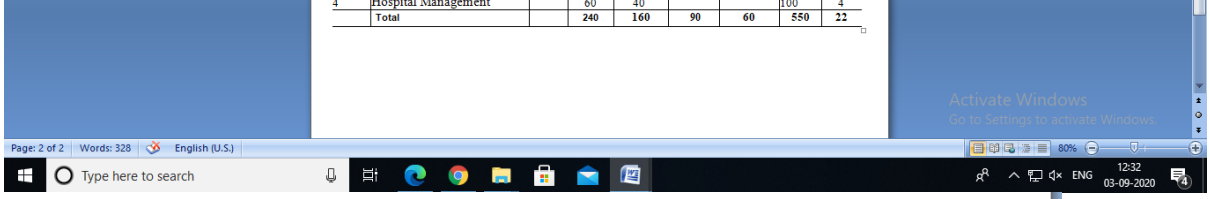
B.Sc. Cardiac Care Technology

Faculty of Allied Health Sciences

2019-20

Examination Scheme (B.Sc Cardiac care Technology)

Paper	Subject	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
			Univ. Exam.	Internal Assessm	Univ. Exam.	Internal Assessm		
Semester- I								
1	Anatomy		60	40	30	20	150	4+2
2	Physiology		60	40	30	20	150	4+2
3	Biochemistry		60	40	30	20	150	4+2
4	Communication Skills and Personality Development		60	40	-	-	100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**
Semester-II								
3	Pathology		60	40	30	20	150	4+2
4	Microbiology		60	40	30	20	150	4+2
5	Pharmacology		60	40	30	20	150	4+2
7	Fundamentals of Computer Science		60	40	-	-	100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**
Semester –III								
1	Applied pathology		60	40	30	20	150	4+2
2	Applied Microbiology		60	40	30	20	150	4+2
3	Basic cardiac care technology		60	40	30	20	150	4+2
4	Environmental Science		60	40	-	-	100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**
Semester –IV								
1	Basic Patient Care		60	40	30	20	150	4+2
2	Basic cardiac Evaluation		60	40	30	20	150	4+2
3	Basics of Medical Disorders		60	40	30	20	150	4+2
4	Coronary Angiography		60	40			100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**



4	Hospital Management		60	40			100	4
	Total		240	160	90	60	550	22

Semester –V								
Paper	**Subject**	**Paper Code**	**Theory Examination**		**Practical Examination**		**Total Marks**	**Credits**
			Univ. Exam.	Internal Assessm	Univ. Exam.	Internal Assessm		
1	Cardiac Evaluation		60	40	30	20	150	4+2
2	Basic cardiac Evaluation and therapies (part-1)		60	40	30	20	150	4+2
3	Basic cardiac Evaluation and therapies (part-2)		60	40	30	20	150	4+2
4	Research Methodology and Bio-statics		60	40	-	-	100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**
Semester-VI								
1	Cardiac care technology clinical		60	40	30	20	150	4+2
2	Cardiac care technology applied		60	40	30	20	150	4+2
3	Basic intensive care		60	40	30	20	150	4+2
4	Hospital Management		60	40			100	4
	Total		**240**	**160**	**90**	**60**	**550**	**22**

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Semester I

Paper 1-

Anatomy Total Hours 50

Unit I

Organization of the Human Body, Introduction to the human body, Definition and subdivisions of anatomy, Anatomical position and terminology, Cell - Definition of a cell, shapes and sizes of cells

- Parts of a cell - cell membranes, cytoplasm, sub cellular organelles.

  Cell Division - Definition and main events in different stages of mitosis and meiosis.

Tissues - Tissues of the body

- Definition and types of tissues
- Characteristics, functions and locations of different types of tissues
- Epithelial tissue - definition, classification with examples
- Glands- classification with examples

Unit II

Locomotion and Support (General Anatomy)

1. **Cartilage - Types with examples**
2. **Skeletal system,** Skeleton - Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Marking of bones. Functions of bones.Development (types and ossification) and growth of bone.Name, location and general features of the bones of the body.

   Joints - Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, ligaments, movements possible and the muscles producing such movements of the joints of the body.
3. **Muscular system ,** Parts of the Skeletal muscle. Definition of origin and insertion. Classification of muscular tissue. Compartment muscles of upper limb, lower limb, sternocleidomastoid

Unit III

Maintenance of the Human Body

1. **Cardio-vascular system,** Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall. Conducting system and blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of major arteries and veins.
2. **Lymphatic system,** Lymph, lymphatic vessels, name, location and features of the lymphoid organs.
3. **Respiratory system,** Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

4. **Digestive system,** Names of organs of digestion. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder

Unit IV

1.Urinary system and Reproductive system, Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra, Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus, uterine tube, ovary & mammary gland.

2. Development, Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles. Derivatives of germ layers, placenta

Unit V

Control Systems of the Body

1. **Nervous system,** Sub-divisions of the nervous system
   Brain - Sub-divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. Spinal cord - Location, extent, spinal segments, external features and internal structure.Location and features of thalamus and hypothalamus.Locations and subdivisions of basal ganglia. Meninges and spaces around them.Name and location of ventricles of brain and circulation of cerebrospinal fluid.Blood supply of the brain and spinal cord. Cranial nerves
2. **Sense organs,** Location and features of the nose, tongue, eye, ear and skin
3. **Endocrine system,** Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes. Names of hormones produced by each gland.

Practical:

1. Demonstration of parts of microscope and its uses
2. Demonstration of skeleton and joint
3. Demonstration of deltoid and gluteus maximus, Cubital fossa
4. Demonstration of heart and its blood supply, demonstration of major arteries of Upper limb and lower limb, histology of cardiac muscle and histology of vessels

Recommended Books Recent Editions:

1. Ross and Wilson: Anatomy and Physiology in Health and illness
2. Understanding Human Anatomy and Physiology, William Davis (p) MC Graw Hill
3. Essentials of Human Embryology. Bhatnagar, Orient Blackswan Pvt. Ltd.
4. Anatomy for B.Sc Nursing by Renu Chauhan. Arichal publishing company 2012
5. Hand book of Anatomy BD Chaurasia

Reference books:

1. B D Chaurasia: Regional Anatomy. Vol I, II, III 6th edition

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Semester I

Paper 2-

Physiology Total Hours 50

Unit -I

General physiology and Blood 8 Hrs General Physiology, Organization of the cell and its function, homeostasis, Transport across cell membrane, Membrane Potentials, Resting Membrane Potential & Action Potential, Body Fluid Compartments - Normal Values

Blood: Introduction: composition and function of blood. Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation. Structure, function, concentration, physiological variation, methods of estimation of haemoglobin. White blood cells: production, function, count. Platelets: origin, normal count, morphology & functions. Plasma proteins: types, functions, Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting - Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching. Rh system: Rh factor, Rh incompatibility. Blood transfusion: indication. transfusion reactions. Anticoagulants: classification, examples and uses. Anaemias: morphological and etiological classification, -Blood indices: CI, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values.

Unit -II

Digestive system & Respiratory system 10hrs

Digestive System, Physiological anatomy of gastro intestinal tract, functions of digestive system. Salivary glands: structure and functions, deglutition: stages and regulation. Stomach: structure and functions. Gastric secretion: composition function regulation of gastric juice secretion. Pancreas : structure, function, composition of pancreatic juice. Functions of liver. Bile secretion, composition, function. jaundice: types. Functions of gall bladder. Small intestine: functions, digestion, absorption, movements. Large intestine: functions, movements defecation

Respiratory system Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary & intrapleural pressure. Surface tension, recoil tendency of the thoracic cage and lungs . Transport of respiratory gases: transport of oxygen & carbon dioxide, oxy haemoglobin dissociation curve, factors affecting it. Lung volumes and capacities - normal values Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre. Applied physiology : hypoxia, cyanosis, dyspnoea, apnoea.

Unit III

Cardiovascular and Endocrine system

Cardiovascular system Heart: Physiological Anatomy, Nerve supply. Properties of cardiac muscle, cardiac cycle: Conducting System of Heart, Origin and Spread of Cardiac Impulse, Electrocardiogram (ECG) waves and normal duration. Recording Cardiac Cycle: Phases and Volume Changes, Normal heart sounds, areas of auscultation. Pulse: jugular, radial pulse, Cardiac output : definitions of stroke volume, cardiac index, factors Affecting It. measurement of Cardiac output. General principles

of circulation. Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension. Factors affecting it and regulation, Physiological variations & regulation of heart rate. Coronary circulation, Shock

Endocrine System , Classification of endocrine glands & Definition of hormone. Pituitary hormones: anterior and posterior pituitary hormones, secretion, functions, Thyroid gland: physiological anatomy, hormone secreted, physiological function, regulation, secretion, disorders (hypo and hyper secretion of hormone). Adrenal cortex: physiological anatomy. cortical hormones, functions and regulation. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline. 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:

Unit -IV

Excretory system and Reproductive system 10 hrs

Excretory System, Functional anatomy of kidney, Juxta glomerular apparatus: structure and function. Glomerular filtration, Tubular function(reabsorption and secretion), Micturition, innervation of bladder, cystometrogram. Artificial kidney, renal function tests skin and body temperature

Reproductive system Male reproductive system: functions of testes, spermatogenesis: Endocrine functions of testes -Female reproductive system: oestrogen, progesteron, menstrual cycle: ovulation, physiological changes during pregnancy, pregnancy tests. Lactation: composition of milk, factors controlling lactation.

Muscle nerve physiology, Nervous system and Special senses, properties of neuron and neuroglia. Classification of nerve fibers Classification of muscle, structure of skeletal muscle, Neuromuscular junction. Transmission across nmj Excitation contraction coupling. muscle tone, fatigue, rigor mortis.

Nervous system, Organisation of nervous system, Synapse: structure, types, properties., Receptors: definition, classification, properties. Sensations-pain, Organization Spinal cord. Ascending tracts, descending tracts. Reflex : definition reflex arc, clinical classification of reflexes : Babinski's sign. Hypothalamus- functions Cerebral cortex lobes - functions, Cerebellum- functions, Basal ganglia functions. Cerebro Spinal Fluid (CSF) : formation, circulation & reabsorption . composition and functions. Lumbar puncture. Autonomic Nervous System: Sympathetic and parasympathetic distribution

Special senses Vision: structure of eye, function of different parts. Structure of retina. visual pathway, errors of refraction, Hearing: structure and functions of ear.Taste : taste buds and taste pathway.Olfaction : receptors, pathway.

Practicals:

1. Haemoglobinometry.
2. Haemocytometry
3. Total leucocyte count.
4. Total Red blood cell count.
5. Determination of blood groups.
6. Differential WBC count.
7. Determination of clotting time, bleeding time.
8. Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume,

Calculation of Blood indices: CI, MCH, MCV, MCHC.
9. Blood pressure recording.
10. Spirometery, Artificial Respiration

Recommended Books Recent Editions

1. A.K.Jain, Human Physiology and Biochemistry for Physical Therapy and Occupational Therapy, 1st Ed. Arya Publication.
2. Dr. Venkatesh.D and Dr. Sudhakar H.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Book

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Semester I

Paper 3-

Biochemistry Total Hours 50

Unit I

Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids &Nucleotides-Cell-Structure & Function of Cell Membrane, Subcellular Organelles and their Functions. Carbohydrates- Definition, Classification & Biological importance of carbohydrates, Derivatives of Monosaccharides.Proteins- Definition & Classification of amino acids & Proteins, Biologically important peptides Plasma proteins, Immunoglobulins. Lipids-Definition, Classification & Biological importance and Functions of Lipids. Structure and functions of Cholesterol, types and functions of Lipoproteins. Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides.

Unit II

Enzymes & Acid base balance, Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition & Regulation of enzyme activity, Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

Unit III

Vitamins & Minerals, Vitamins-Classification, Sources, RDA, Functions(in brief), deficiency manifestations and hypervitaminosis. Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, selenium, sodium, potassium and chloride.

Unit IV

Nutrition, Blood chemistry & Urine Chemistry Nutrition- Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications, Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance, Protein energy malnutrition, Total parenteral nutrition, dietary fibers. Blood chemistry- Biochemical components & their reference ranges in normal & diseased states. Urine chemistry- Biochemical components & their reference ranges in normal & diseased states.

Unit V

Clinical Biochemistry-

Specimen Collection- Blood,Urine and Body fluids. Preanalytical, analytical and postanalytical errors Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases. Diagnostic enzymology, Assessment of arterial Blood gas status and electrolyte balance, Point of Care Testing. Renal Function tests(in brief), Liver function tests(in brief), Biomedical Waste Management.

Practicals:

1. General Reactions of Carbohydrates.
2. Color reactions of Proteins.
3. Reactions of Non Protein nitrogenous substances.
4. Demonstration of pH meter, Colorimeter and spectrophotometer.

Recommended books Recent edition

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry -Pankaja Naik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

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Semester I

Paper 4-

Communication skill and personality development Total Hours 50

UNIT 1

Listening Comprehension, Speeches**,** Interviews, audio-video clippings followed by exercises, Introduction to Communication**,** Importance of Communication**,** Barriers to Communication and ways to overcome them.

UNIT 2

Conversation Skills, Greetings and Introducing oneself**,** Framing questions and answers**,** Role play**,** Buying: asking details etc**,** Word formation strategies**,** Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

UNIT 3

Reading Comprehension, Simple narration and Stories, Newspaper and articles clippings, Sentence types, Note Making, Paragraph Writing, Comprehension, Report Writing: types, characteristics.

UNIT 4

Pronunciation, Pronunciation**,** Syllable and Stress**,** Into nation and Modulation.

UNIT 5

Writing Comprehension, Letters: types, format, style**,** Précis Writing**,** Paragraph: Order, Topic sentence, consistency, coherence**,** Report and Proposal**,** Project Writing: Features, Structure.

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Semester II

Paper 1-

Pathology Total Hours 50

Unit I

Introduction- & scope of pathology Cell injury and Cellular adaptations - Normal cell, Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia. Inflammation-Introduction, 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. Haemodynamic disorders-Oedema, hypermia, congestion, haemorrhage, embolism, thrombosis, infarction. Neoplasia - defintion, 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.

Unit II

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 anamia: causes, labfindings, haemolytic anemias: definition. Causes, classification and labfindings.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.

Unit- III

Basic Hematological Techniques Characteristics of good technician, Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, patient after care, 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.

Unit IV

Transfusion Medicine Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications.

Unit V

Clinical Pathology Introduction to clinical pathology - collection, transport, preservation, and processing of various clinical specimens. Urinalysis - collection. Preservatives, physical, chemical examination and microscopy. 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 pigments fouchet method, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich

aldehyde and schwartz test, bence jones protein., microscopy. Examination of cerebrospinal fluid - physical examination, chemical examination, microscopic examination, examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination,

Practicals:

- Laboratory organization-
- Reception of specimen, dispatch of reports, records keeping, coding of cases.
- Laboratory safety guidelines.
- SI units and conventional units in hospital laboratory.
- Haematology techniques
- Basic requirements for hematology laboratory
- Glasswares for hematology
- Equipments for haematology.
- Anticoagulant vials
- Complete blood counts**.**

Recommended Books :

5. Text book of Pathology Harsha Mmohan Jaypee Brothers, New Delhi.
6. Practical Pathology P. Chakraborthy, Gargi Chakarborty New Central book agency, Kolkata.
7. Text book of Haematology Dr Tejinder Singh Arya Publications, Sirmour (H P)
8. Text book of Medical Laboratory Technology Praful Godkar Bhalani Publications house, Mumbai.

Textbook of Medical Laboratory Technology Ramanik Sood.

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Semester II

Paper 2-

Microbiology Total Hours 50

Unit - I

General Microbiology Morphology and classification of microorganisms. Growth, nutrition and multiplication of bacteria Sterilization and Disinfection - Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants Immunology - antigen, Antibodies, Immunity, vaccines, types of vaccine and immunization schedule. Hospital acquired infection - Causative agents, transmission methods, investigation, prevention and control of hospital Acquired infections.

Unit - II

Bacteriology, Classification of bacteria, morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium diphtheriae, Clostridia, Enterobacteriaceae - Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas and Spirochetes

Unit III

Mycobacteriology & Parasitology, Mycobacteria- classification, pathogenesis, lab diagnosis and prevention, Classification, infections and lab diagnosis of following parasites. Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

Unit IV

Mycology, Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (Aspergillus, Zygomycetes and Penicillium)

Unit V

Virology, General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies and Poliomyelitis.

Practicals:

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, MacConkey agar with LF & NLF, Nutrient agar with staph colonies.Anaerobic culture, Methods and Antibiotic susceptibility test.
3. Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV, Hbsag and HCV.

4. Grams staining.
5. Acid fast staining.
6. Principles and practice of Biomedical waste management.
7. Stool Microscopy.

Recommended Books Recent Editions.

1. Anathanarayana & Panikar: Medical Microbiology - Revised 8th edition University Press.
2. Parasitology by Chatterjee - Interpretation to Clinical Medicine.
3. Textbook of Microbiology - Baveja, 5th edition, Arya Publications
4. Textbook for Laboratory technicians by RamnikSood. Jaypee Publishers
5. Textbook of Parasitology by Paniker. 7th edition

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Semester II

Paper 3-

Pharmacology Total Hours 50

Unit I

General Pharmacology, ANS, PNS. Sources of Drugs Route of drug administration Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion) Pharmacodynamics (Mechanisms of action) Adverse drug reactions, ANS : ADRENERGIC Drugs - Adrenaline, Noradrenaline, Ephidrine, Dopamine, Dobutamine Anti adrenergic - Phentolamine, Phenoxybenzamine, Prazocin, Tamsulosin, Propranolol, Atenolol, Carvidelol Cholinergic drugs-Acetyl choline, Pilocarpine, Neostigmine, Organophosphorous compounds Anti cholinergic agents-Atropine, Glycopyrrolate, Ipratropium Bromide, Dicyclomine

Unit II

PNS, CVS, Renal System, Skeletal muscle relaxants - D Tubocurarine, Succinyl choline, Diazepam, Dantroline Local anaesthetics - lignocaine, la + vasoconstrictor CVS - ionotropic agents - Digoxin, Antianginal drugs - GTN, Antihypertensives - Betablockers (Propranolol, Atenolol, carvidelol), CCBs (Nifedeine), Diuretics (Thiazide, Furesemide, ace inhibitors, ARBs, Clonidine Drugs used in treatment of different types of shock, Plasma expanders Renal system - Diuretics Furosemide, Thiazide, Spiranolactone Antidiuretics - Vasopressin

Unit III

CNS, Blood: CNS - general Anaesthetics - nitrous oxide, Halothane, iv anaesthetics Sedative hypnotics - diazepam, barbiturates, zolpidem, Antiepileptics - Phenytoin, carbamezapine, phenobarbitone, valproate, Opioid analgesics - morphine, pethidine, codeine, NSAIDS - Aspirin, Diclofenacibuprofen, Selective COX2 inhibitors, Respiratory system-treatment of cough And Bronchial asthma, Blood - Hematinics, Anticoagulants - Warfarin, Heparin, Thrombolytics & Antiplatelet drugs - streptokinase,/ aspirin, clopidogrel

Unit IV

GIT, Chemotherapy: GIT - drugs used in peptic ulcer - ppi, H2 blockers, Antacids Antiemetics - Metaclopromide, Domperidone, Ondensetron Purgatives & Laxatives-bran, ispaghula, Lactulose, Bisacodyl &senna Drugs used in Diarrhoea- ORS, Super ORS, Antimotility drugs (loperamide, diphenoxylate)**,** Chemotherapy - general considerations MOA, Resistance, Prophylaxis Sulfonamides, cotrimoxazoles, Quinolones Tetracyclines, chloramphenicol**,** Betalactam antibiotics

Unit V

Chemotherapy, Hormones. Aminoglycosides, Macrolides, other antibiotics (vancomycin, linezolid) & treatment of UTI Antifungal (clotrimazole, flucanozole), Antiviral (Acyclovir, Few drugs used in HAART,), Cancer chemotherapy (names, common Adverse effects, general principles in the treatment of cancer) Hormones - Corticosteroids its uses and adverse effects, Treatment of Diabetes mellitus(insulin, Metformin, Glibenclamide)

Practicals Syllabus : -

- Dosage forms, Solid Dosage forms, Liquid Dosage forms, Gaseous Dosage forms, Oral route, Parentral routes, Novel routes
- Fixed dose combination - Amoxycillin + clavulinic acid - cotrimoxazole, Lignocaine + Adrenaline
- Drug stations - Adrenaline, dopamine, Dobutamine)
- Drug stations - Corticosteroids (hydrocortisone, prednisalone, inhaltional steroids) Drug stations - common antibiotics (amoxycillin, ciprofloxacin, Azithromycin, Metronidazole, Cephalosporins)
- Drug stations - Insulin preparations
- Instrument & devices (Nasogastric tube, laryngoscope, Different Cathetors, nebulizers, Inhalers, Rotahalers)

Recommended Books Recent Editions.

1. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, Emca House, 23/23, Bansari Road, Daryaganj, New Delhi.
2. Padmaja Udaykumar -Pharmacology for Allied Sciences.
3. R.S. Satoskar, S.D. Bhandarkar, S.S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th edition, Single Volume, M/s Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.

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Semester II

Paper 4-

Fundamentals of Computer Science Total Hours 50

Unit 1

Introduction about computers

What are Computers? Its various characteristics, applications and limitations. Functional Block Diagram of computer.

Computer Architecture: Classification of computer on basis of Purpose, signal and size and portability.

Evolution of computer from 1st generation to fourth generation. Some description about fifth generation.

Data representation in memory.

Unit 2

Hardware:

To study the various input devices used: Keyboard, mouse, OMR, OCR, MICR, BCR, Scanner etc.

To study the internal structure of CPU: Registers, ALU, Motherboard, HD, Memory, Cache, and Virtual Memory. TO study the various Secondary storage devices: Magnetic Disk, Optical Disk, Flash memory, To cover what are Monitor, Its types, Printer: Dot matrix, Daisy wheel. Line printer, Laser printer, Thermal Printer, Ink Jet printers etc.

Unit 3

To cover the types of Software, Languages and their types (High level and low level language.) To cover the definition of operating system, its types and what are the various functions and types of operating system.

Basic introduction about Interfaces: its types character user and graphical user interface (DOS and Windows)

Basic introduction about linux,Unix operating system

To study the various HTML tags (Bold tags, Italic, Underline, Marquee, Img, anchor etc.)

Unit 4

Network:

Data Communication,

Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), HTTP Practicals: TO cover the various MS Excel Formulas and preparation of spreadsheets.

Basics of E-mail, Web browsers (IE, Google Chrome, Mozilla),

LAN, LAN topologies, WAN, MAN, Internet: Introduction, Internet, extranet and Intranet.

Network devices (Hub, Switches, Modems, Routers etc), DNS, Network Security and Search Engine

IP address, Structure of IP Address

Backbone network, Network connecting devices

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Semester III

Paper 1-

Applied Pathology Total Hours 50

UNIT I

Atherosclerosis-definition, risk factors, pathogenesis, morphology and complications, Ischemic heart disease: Myocardial infarction- definition, pathogenesis, morphology and complications, Hypertension- Benign and malignant hypertension: pathogenesis, pathology and complications

UNIT II

Heart failure-Right and left heart failure: causes, pathophysiology and morphology, Rheumatic heart disease and infectious endocarditis- definition, etiopathogenesis, morphology and complications, Congenital heart disease- Types and atrial septal defect; aneurysms- types and morphology; cardiomyopathies in brief.

UNIT III

Atelectasis - types, Adult respiratory distress syndrome - causes , pathogenesis and morphology; pulmonary edema- classification, causes and morphology, Chronic obstructive pulmonary disease- Chronic bronchitis, emphysema, asthma, bronchiectasis: Definition, etiopathogenesis and morphology, Restrictive pulmonary diseases- Definition, categories, pathogenesis and morphology

UNIT IV

Pneumoconiosis-types, asbestosis, coal workers pneumoconiosis-etiopathogenesis and morphology, Pulmonary embolism, infarction, pulmonary hypertension-Definition, etiopathogenesis and morphology, Pneumonia-Classification of pneumonias; Lobar pneumonia and bronchopneumonia - etiology, pathology and complications

UNIT V

Clinical manifestations of renal diseases, Glomerular lesions in systemic diseases- diabetes, amyloidosis and systemic lupus erythematosus, Pericardial and pleural effusions- causes and microscopy.

Practicals:

1. Urine examination: physical, chemical, microscopy
2. Blood grouping & Rh typing
3. Hemoglobin estimation, packed cell volume (PCV), erythrocyte sedimentation rate (ESR)
4. Charts
5. Specimens

* Atherosclerosis
* Pneumonia
* Tuberculosis
* Infarct - lung
* Contracted kidney
* Hydronephrosis

Reference Books (latest edition)

1. Basic Pathology Robbins Saunders an imprint of Elsevier Inc., Philadelphia, USA
2. Text book of Pathology Harsh Mohan Jaypee Brothers, New Delhi
3. Practical Pathology P. Chakraborty, Gargi Chakraborty New Central Book Agency, Kolkata
4. Text Book of Haematology Dr. Tejinder Singh Arya Publications, Sirmour (H.P)
5. Text Book of Medical Laboratory Technology Praful Godkar, Bhalani Publication House, Mumbai
6. Text Book of Medical Laboratory Technology Ramanik Sood

Practical Haematology Sir John Dacie Churchill Livingstone, London

B.Sc. Cardiac Care Technology

Semester III

Paper 2-

Applied Microbiology Total Hours 50

Unit I.

Sterilization and disinfection, Sterilization and disinfection - classification, principle, methods, Central sterile supply department

Unit II.

Importance of sterilization and disinfection, Disinfection of instruments used in patient care, Disinfection of patient care unit, Infection control measures for ICUs

Unit III.

Health care associated infections, Surgical site infections, Urinary tract infections, Ventilator associated pneumonia, Catheter associated blood stream infections, Antibiotic associated diarrhea.

Unit IV.

Drug resistant bacteria, MRSA, VRE, Drug resistant Gram negative bacteria

Unit V.

Occupationally acquired infections and its prevention, Respiratory route - Tuberculosis, Varicella zoster virus, Influenza, RSV, Blood borne route - HIV, HBV, HCV, CMV, Ebola, Orofecal route - Salmonella, Hepatitis A, Direct contact - Herpes virus

Practicals:

1. Sterilization and disinfection practices in tertiary care hospital
2. Quality control of sterilization and Interpretation of results of sterility testing
3. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.

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Recommended Books:

- Textbook of Microbiology by Ananthnarayan and paniker
- Textbook of hospital infection control by Purvamathur
- Textbook of Microbiology by Baveja
- Hospital infection control by Mayhall

B.Sc. Cardiac Care Technology

Semester III

Paper 3-

Basic Cardiac Care Technology Total Hours 50

Unit I

Applied Anatomy and Physiology -

1. Applied Anatomy
   a) Structure of the heart and gross anatomy, normal position situs solitus, situs inverses with dextrocardia, situs solitus with dextrocardia, situs inversus with levocardia.
   b) Systemic and pulmonary circulation, coronary structure, coronary sinus structure and circulation.
   c) Chest topography - identification of imaginary lines, topographical landmarks over thorax, topography of heart and lungs.
   d) Surface marking of heart, aorta, pulmonary artery, precordium, heart valves, subclavian.
2. Applied Physiology
   a) Control of heart rate.
   b) Concepts of congenital heart (ASD, VSD, PDA, TOF and transpositions).
   c) Blood circulation, cardiac output, pulmonary circulation, pulmonary oedema
   d) Concepts of myocardial functions.
   e) Control of circulation
   f) Conduction system of the heart

Unit II

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.
f) ECG anatomy - Chambers enlargement.
g) Technical artefacts
h) ECG reportingExercise 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.
a) Result Reporting

Unit III

Noninvasive Echocardiography -

a) Introduction and purposes, demonstration of machine parts,
b) Basic windows
c) Echocardiographic views
d) Imaging modes - two-dimensional (2D) imaging, M-mode imaging, and Doppler imaging, color - flow mapping.

Unit IV

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.

Unit V

Gas Administration Devices -

3. Gas administration devices (reducing valves, flow meters and regulators).

a) Simple oxygen administration devices.
b) Methods of controlling gas flow.
c) Reducing valve, Flow meters, restrictors and regulators
d) Selection of device

Practical:

1. History taking
2. Clinical Examination: General Physical Examination and assessment of vital signs
3. Clinical Examination: Basic Systemic Examination
4. Conversion between different units

B.Sc. Cardiac Care Technology

Semester III

Paper 4-

Environmental Science Total Hours 50

Unit 1:

The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness

Natural Resources
Renewable and non-renewable resources: Natural resources and associated problems

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2:

Ecosystems
Concept of an ecosystem.
Structure and function of an ecosystem.
Producers, consumers and decomposers.

Energy flow in the ecosystem.
Ecological succession.
Food chains, food webs and ecological pyramids.

Biodiversity and its conservation
Hot-spots of biodiversity.
Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts
Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit 3:

Environmental Pollution

Definition, causes, effects and control measures of:-

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes.

Fireworks, their impacts and hazards

Pollution case studies.

Disaster management: floods, earthquake, cyclone and landslides.

Unit 4 :

Social Issues and the Environment
From Unsustainable to Sustainable development

Urban problems related to energy
Water conservation, rain water harvesting, watershed management,

Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions.
Consumerism and waste products.
Environmental Legislation (Acts and Laws)

Issues involved in enforcement of environmental legislation
Human Population and the Environment

Population growth, variation among nations with case studies
Population explosion – Family Welfare Programmes and Family Planning Programmes

Human Rights.
Value Education.
Women and Child Welfare.

B.Sc. Cardiac Care Technology

Semester IV

Paper 1-

Basic Patient care

Total Hours 50

Unit I

Introduction, Communication and Documentation - **Introduction to Patient Care:** Principles of patient care. Types of patients (gender, age, diseases, severity of illness, triage). **Communication & Documentation:** Communication with doctors, colleagues and other staffs. Non-verbal communication, Inter-personnel relationships. patient contact techniques, communication with patients and their relatives, **Documentation:** Importance of documentation, initial and follow up notes; documentation of therapy, procedures and communication

Unit II

Universal Precautions and Infection Control - **Universal Precautions and Infection Control:** Hand washing and hygiene, Injuries and Personal protection, Insulation and safety procedures, Aseptic techniques, sterilization and disinfection, Disinfection and Sterilization of devices and equipment, Central sterilization and supply department, Biomedical Medical waste management

Unit III

Medication Administration and Transport of patient -**Medication Administration:** Oral/Parenteral route, Parenteral medication administration: Intra venous, intra muscular, sub-cutaneous, intra dermal routes, Intra venous Infusion, Aerosol medication administration, Oxygen therapy, Intravenous fluids, Blood and blood component transfusion. **Position and Transport of patient:** Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep. Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher. Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV

Bedside care and monitoring-Bedside care: Methods of giving nourishment: feeding, tube feeding, drips, transfusion. Recording of pulse, blood pressure, respiration, saturation and temperature. Bed side management: giving and taking bed pan, urine container. Observation of stools, urine, sputum, drains. Use and care of catheters and rubber goods. Care of immobile/bed ridden patients, bed sore and aspiration prevention
Monitoring of Patient: Pulse, ECG (Cardiac Monitor), Oxygen Saturation, Blood Pressure, Respiration, Multi parameter monitors, Capnography and End Tidal CO2 (ETCO2),Hydration, intake and output monitoring Monitoring ventilator parameters: Respiratory Rate, Volumes, Pressures, Compliance, Resistance.

Unit IV

Dressing and wound care: Bandaging: basic turns, bandaging extremities, triangular bandages and their application. Surgical dressing: observation of dressing procedures. Suture materials and suturing techniques**,** Splinting**.** Basic care of patient with burns.

Practical:

1. Demonstration of Patient care Procedures:
   a) Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding
   b) Phlebotomy and obtaining blood samples, Arterial Blood sampling for ABG
   c) Injections: intra muscular, intra venous, sub cutaneous, intra dermal
   d) Insertion of intra venous catheter and infusion of medications, blood transfusion
   e) Recording of ECG and monitoring of patient
   f) Oxygen therapy: oxygen cannula, masks. Aerosol therapy: nebulization, inhalers
   g) Suctioning and care of artificial airway
   h) Insertion of urinary bladder catheter
2. Uses, principles, advantages and disadvantages of instruments and Devices in patient care
3. First aid and Basic Life Support (BLS)

Practical:

Spotters, Drugs, Instruments and devices - identification and usage, demonstration of patient care procedures.

Reference Books:

2. Principles and practice of Nursing - Sr Nancy
3. Introduction to Critical Care Nursing - Mary Lou Sole
4. First Aid - Redcross society guidelines
5. Basic Life Support (BLS) - American Heart Association guidelines

B.Sc. Cardiac Care Technology

Semester IV
Paper 2-
Basics Cardiac Evaluation Total Hours 50

Unit I

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) Shock state
h) Cardiomyopathy
i) Hypertension, diabetes, dyslipidaemias
j) Infective endocarditis
k) Heart failure
l) Pulmonary hypertension and embolism

Unit II

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) 24 hours Holter monitoring
f) Ambulatory BP monitoring
f) Tilt table test
g) Ankle-Brachial Index

Unit III

Cardiovascular investigations: Invasive

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 diseases
g) Complications of cardiac catheterization
h) Complications and management of Contrast

Unit IV

Cardiovascular pharmacological therapies

a) Antiplatelets
b) Anticoagulants
c) Antiarrhythmic
d) Antihypertensive
e) Intravenous fluids
f) Atropin
g) Inotropics
h) 2B 3A receptors blocking agents
I) Diuretics
j) Nitrates
k) miscellaneous

Unit V

Cardiovascular interventional therapies

a) Coronary angioplasty
b) Peripheral angioplasty
c) Mitral valvoplasty
d) Pulmonary and aortic valvuplasty
e) Device closures
f) Pacemakers
g) Pericardiocentesis
h) Myocardial biopsy
i) Retrieval of foreign bodies
j) Clot aspiration

Practicals:

Non invasive Technology;

a) ECG recording basic
b) ECHO evaluation basic
c) Preparation for treadmill test
d) Preparation for 24 hours Holter monitoring
e) Preparation for ABPM

Invasive Technology;

a) Cardiac Cath right Heart
b) Cardiac Cath Left Heart
c) Cardiovascular Angiography
d) Cardiac Pacing
e) Relevant instrumentation in Cath Lab
f) Cardiac Emergencies in Cath Lab

B.Sc. Cardiac Care Technology

Semester IV

Paper 3-

Basics of Medical Disorders Total Hours 50

Unit I

Cardiac and Respiratory diseases - 10 hours

1. Cardio vascular diseases
   a. Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias
   b. Heart failure, shock - types, causes
2. Respiratory diseases
   a. Pneumonia, tuberculosis,
   b. Chronic obstructive pulmonary disease, asthma
   c. Pleural effusion, pneumothorax
   d. Interstitial lung disease

Unit II

Neurological, Renal, GI and infectious diseases - 10hours

3. Neurological diseases
   a. Polio myelitis, Gullian Barre Syndrome, Myasthenia Gravis, epilepsy / seizure disorder, cerebro vascular accident / stroke
4. Renal Diseases
   a. Acute kidney injury
   b. Chronic Kidney Disease
5. Gastro intestinal and Liver Diseases
   a. Gastritis / APD, peptic ulcer
   b. Acute gastroenteritis
   c. Hepatitis, Hepatic failure, alcoholic liver disease
6. Infectious diseases: Dengue, malaria, leptospirosis

Unit III

Blood, fluid, electrolyte and acid base abnormalities - 10 hours

7. Blood loss and Anemia, thrombocytopenia
8. Fluid Electrolyte imbalance and corrective methods
9. Acid Base abnormalities and corrective methods

Unit IV

Pulmonary Oedema, Sepsis and MODS - 10 hours

10. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome
11. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome

Unit V

Health problems in Specific conditions and Toxicology –

. Health problems in specific conditions

a. Pregnancy - antenatal care, disorders in pregnancy
b. Children and new born
c. Obesity
d. Diabetes mellitus
e. HIV infections and AIDS
f. Elderly subjects and disability
g. Brief mention about endocrine disorders

13. Poisoning and drug over dosing

a. Classification of poisons
b. Principles of treatment of poisoning and Primary care
c. Poisons and drug over dosing requiring ventilation

14. Miscellaneous

a. Drowning
b. Hanging

Practical:

1. History Taking and clinical examination, monitoring of patient.
2. Therapeutic options for various diseases and conditions

Recommended Books Recent Editions.

1. Davidson's Principles and Practice of Medicine - Elsevier Publications
2. Harrison's Principle of Internal Medicine

B.Sc. Cardiac Care Technology

Semester IV

Paper 4-

Coronary Angiography Total Hours 50

Introduction to coronary angiogram

History of coronary angiography

Instrumentation in coronary angiography

Indications for coronary angiography

Contraindications for coronary angiography

Procedure

Approach

Seldingers technique

Catheters for coronary angiography

Views for coronary angiography

Evaluation of a coronary lesion

Reporting of coronary angiography

Decision making on management

Revascularization PTCA or CABG

Planning review of protocol

Post procedure care

Drugs

Groin care (femoral approach)
Wrist care (radial approach)

Complications and management

Practical assessment:

Spotters

Video Clips

Demonstration of common disorders

B.Sc. Cardiac Care Technology

Semester V
Paper 1-
Cardiac Evaluation Total Hours 50

Unit I

Clinical disorders of heart

a) Clinical presentation, evaluation and management of acute coronary syndromes
b) Clinical presentation, evaluation and management of stable ischemic heart disease
c) Hypertension, diagnosis, complications and management
d) Cardiac arrhythmia, presentation, diagnosis and management
e) Heart failure, classification, diagnosis and management

Unit II

Drugs and Nutrition in Cardiac Care

1. Drugs acting on cardiac system and emergency cardiovascular drugs
   a. Antiplatelets drugs
   b. Antiischaemic drugs
   c. Thrombolytic drugs
   d. Antiarrhythmic drugs
2.Nutrition assessment and management

Unit III

Patient monitoring in cardiac care

3. 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

Unit IV

Cardiovascular investigations: Noninvasive

a) ECG - Review of ECG patterns in ischaemic heart diseases, hypertensive heart disease.
b) Echocardiography - A review of Evaluation of valvular heart diseases, ischaemic heart diseases, Cardiomyopathies and pericardial diseases
c) Pulmonary hypertension, infective endocarditis, intracardiac masses.
d) Stress test- treadmill test review, pharmacological stress testing.
e) 24 hours Holter monitoring

Unit V

Cardiovascular investigations: Invasive

a) Coronary angiography
b) Diagnosis of mitral stenosis, regurgitation and mixed
c) Diagnosis of shunts A review
d) Diagnosis of peripheral and aortic diseases
e) Complications of cardiac catheterization
f) Contrast induced nephropathy prevention and management

Practicals/ Students Presentations - Round Table

1. Diagnostic patterns of ECG changes in a patient with chest pain.
2. Diagnostic patterns of ECG changes during stress test
3. Evaluation of rheumatic mitral stenosis by echocardiography
4. Evaluation of Pericardial effusion by echocardiography

Recommended Books Recent Editions.

1 A Text book of Electrocardiography - Goldberger.
2 Nanda's A Text book of Echocardiography.
3 A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim.
4 A Text book of Cardiovascular Medicine. Dr. Bruanwald's.
5 A Text book of Medicine. Davidsons.

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Semester V
Paper 2-
Basic Cardiac Evaluation and Therapies
(Part 1) Total Hours 50

Unit I

Electrocardiography

a) Optimum recording of 12 leads ECG and computerised interpretation
b) Trouble shooting of ECG artefacts
c) Bradyarrhythmais and tachyarrhythmias.

Stress test (tread mill, bicycle and others)

a) Indications/ contra indications
b) Complications

Unit II

Echocardiography

a) Evaluation of left ventricular studies - 16 segment model
b) Evaluation of left ventricular studies - systolic and diastolic functions
c) Evaluation of right ventricle

Unit III

Invasive techniques

a) Guide wires
b) Diagnostic catheters for coronary angiography
c) Diagnostic catheters for carotid, /cerebral angiography
d) Diagnostic catheters for renal angiography
e) Diagnostic catheters for abdominal vessels

Unit IV

Invasive techniques Procedures

a) Carotid and cerebral angiography
b) Renal angiography
c) Studies of abdominal aorta, mesenteric, iliac and others

Unit V

Care of patient undergoing vascular procedures

a) Indications, contraindications for angiographic studies
b) Patient education of the invasive procedures, consent processes and preparation
c) Monitoring physiological variables during cath lab procedures

d) Post procedure protocols
e) Reporting and data management of the cath procedures

Practicals/ Students Presentations -

a) Right sided ECG chest leads and its importance

b) Demonstration of TAPSE.

c) Demonstration of estimation of pulmonary artery pressure by echocardiography

d) Spotters on guide wires and diagnostic catheters

Recommended Books Recent Editions.

1. A Text book of Electrocardiography - Goldberger
2. Nanda's A Text book of Echocardiography
3. A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
4. A Text book of Cardiovascular medicine. Dr. Bruanwald's
5. A Text book of Medicine. Davidsons

B.Sc. Cardiac Care Technology

Semester V
Paper 3-
Basic Cardiac Evaluation and Therapies (Part 2) Total Hours 50

Unit I

Electrocardiography

a) PR interval
b) QT interval
c) Calculation of heart rate
d) Analysis of ST segment
e) Artefacts in tread mill ECG

Unit II

Echocardiography

a) Basics of pediatric echocardiography.
b) Echocardiography in acute rheumatic fever
c) Echocardiography in chronic rheumatic heart disease
d) Echocardiography in cardiac tamponade

Unit III

Invasive techniques

a) Cardiac pacing indications
b) Cardiac anatomy and its importance in pacing
c) Cardiac pacing physiology
d) Cardiac pacing temporary
e) Cardiac pacing permanent
f) Programing of pacemakers
g) Common problems associated with pacemakers.
h) External cardiac pacingz

Unit IV

I**mportant Medical conditions and their relevance to cardiac care**

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

Unit V

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

Practicals/ students presentations - round table

1. Pacemaker interrogation
2. Demonstration of estimation of severe mitral stenosis by echocardiography

Recommended Books Recent Editions.

1. A Text book of Electrocardiography - Goldberger
2. Nanda's A text book of Echocardiography
3. A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim

B.Sc. Cardiac Care Technology

Semester V

Paper 4-

Skill Enhancement-2 Research Methodology and Biostatistics Total Hours 50

Unit I.

Introduction and Presentation of data

Meaning , Branches of Statistics, Uses of statistics in medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.

Unit II.

Measures of central tendency and Measures of Variation

Arithmetic Mean (Mean), Median, Mode, Partition values, Range, Interquartile range , Mean Deviation, Standard Deviation, Coefficient of Variation.

Unit III.

Probability and standard distributions

Definition of some terms commonly encountered in probability, Probability distributions; Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality; Skewness and kurtosis

Unit IV.

Census and Sampling Methods

Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience sampling, Consecutive Sampling, Quota sampling, Snowball sampling, Judgmental sampling or Purposive sampling, Volunteer sampling, Probability (Random) Sampling methods; Simple random sampling, Systematic Sampling, Stratified Sampling, Cluster sampling, Multi-stage sampling, Sampling error, Non-sampling error.

Unit V.

Inferential statistics

Parameter and statistic, Estimation of parameters; Point estimation, Interval Estimation, Testing of hypothesis; Null and alternative hypotheses, Type-I and Type-II Errors.

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Semester VI

Paper 1-

Cardiac Care Technology Clinical Total Hours 50

Unit I

Documentation and Assessment for Cardiac care

1.Documentation in Non-Invasive technology

a) ECG
b) ECHO
c) TMT

2.Documentation in Invasive technology

a) Angiography
b) Interventional procedures

Unit II

Electrocardiography A review

a) Chamber hypertrophy
b) Acute coronary syndromes
c) Bradyarrhythmias
d) Tachyarrhythmais
e) Pericardial diseases

Unit III

Ambulatory cardiac technologies

a) Holter monitoring
b) Loop recorders
c) Ambulatory blood pressure recording
d) Newer technologies for monitoring the patients with heart diseases

Unit IV

Invasive technologies

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

Unit V

Invasive technologies

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

Practicals/ students presentations - round table

a) Demonstration of various ECGs
b) Demonstration of ambulatory blood pressure hook up and analysis
c) Demonstration of ambulatory (Holter) ECG hook up and analysis
d) Demonstration of Coronary angiographyand analysis
e) Demonstration of PTCA, stenting and other technologies

Recommended Books Recent Editions.

1. A Text book of Electrocardiography - Goldberger
2. Nanda's A Text book of Echocardiography
3. Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
4. A Text book of Cardiovascular Medicine. Dr. Bruanwald's
5. A Text book of Medicine. Davidsons

B.Sc. Cardiac Care Technology

Semester VI

Paper 2-

Cardiac Care Technology Applied Total Hours 50

Unit II

Electrocardiography

a) Diagnoses of acute myocardial infarction
b) Diagnoses of hyperkalemia
c) Diagnoses of WPW syndrome

Unit II

Echocardiography

1) Congenital heart diseases
   a) ASD
   b) VSD
   c) PDA
   d) Coarctation of aorta
   e) Pulmonary and aortic stenosis
   e) Tetralogy of Fallot
   f) Others
2) Transesophageal echocardiography
3) Stress echocardiography (pharmacological
4) 3D echocardiography

Unit III

Cardiac common drugs used in cardiac patients

Drugs acting on cardiac system and emergency cardiovascular drugs

a. Antiplatelets drugs
b. Antiischaemic drugs
c. Thrombolytic drugs
d. Antiarrhythmic drugs
e. Atropine
f. Digoxin
g. Nitrates

Unit IV

Invasive

a) Organization of cath lab services
b) Data management of cath lab
c) Management of intra coronary thrombus
d) Management of hypotension
e) Management of vasovagal attack
f) Management of coronary perforation
g) Management of retrieval of dislodged foreign materials in the vessels

Unit V -

Case studies in cardiology

a) A case of myocardial infarction with complications
b) A case of multivalvular heart disease
c) A case of pulmonary thrombo embolism
d) A case of infective endocarditis
e) A case of mitral valve prolapse
f) A case of rheumatic mitral stenosis

Practicals/ students presentations - round table

a) Demonstration of various varieties of myocardial infarction by ECG
b) Demonstration of ASD various types
c) Demonstration of VSD various types
d) Demonstration of PDA and Coarctation of aorta
e) Stent booster technology
f) Foreign body retrieval methods in the cath lab
g) Balancing transducer
h) Pressure traces, pressure gradients
I) Steps of PTMC
j) Steps of PTCA

Recommended Books Recent Editions.

1. A Text book of Electrocardiography - Goldberger
2. Nanda's A Text book of Echocardiography
3. A text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
4. A Text book of Cardiovascular Medicine. Dr. Bruanwald's
5. A Text book of Medicine. Davidsons

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Semester VI

Paper 3-

Basic Intensive Care Total Hours 50

Unit I

General ICU Care and Monitoring

1. General care and transport of ICU patient - eye, skin, bladder care, position, airways, drains, catheters. Transport of critically ill patient to and out of ICU, transport of patient with drains, airway, inotropes, mechanical ventilator.
2. Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring

Unit II

Infection Control and Nutrition in ICU

3. Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy.
4. Nutrition and Fluid balance - total parentral nutrition, nasogastric tube, gastric tube, jejunostomy tube care and feeding, IV Fluids.

Unit III

Systemic Diseases and Care in ICU

5. Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS
6. Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning.
7. Renal failure: types, etiology, complications, corrective measures
8. Hepatic failure: types, etiology, complications, corrective measures

Unit IV

Head Injury and Trauma care in ICU

9. Head injury and Trauma Care: Glasgow coma scale, care of head injury patient, poly trauma patient
10. Blood and blood products transfusion: Transfusion reactions & complications, Massive transfusion

Unit V

Acid base disorders, neonatal ventilation, imaging in ICU

11. Acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management.
12. Neonatal mechanical ventilation: intubation and problems inherent to the neonate, basic principles of neonatal ventilation, modes, initiation and maintenance.
13. Miscellaneous: X-rays, ultrasound, chest and limb physical therapy in ICU

Practical:

1. Monitoring of Patients
2. Operating devices, ventilator and monitor settings for different clinical conditions
3. Drugs used in Intensive Care
4. Trouble shooting and maintenance of monitors, equipments and ventilators

Recommended Books Recent Editions.

1. Introduction to Critical Care Nursing - Mary Lou Sole
2. Critical Care Notes: Clinical Pocket Guide - Janice Jones

Reference Books

1. AACN Essentials of Critical Care Nursing - American Association of Critical Care Nursing
2. Textbook of Critical Care: Expert Consult - Jean-Louis Vincent
3. The ICU Book - Paul L. Marino.

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Semester VI

Paper 4-

Hospital Management Total Hours 50

Quality Concepts: Definition of Quality, Dimensions of Quality, Basic concepts of Total Quality Management, Quality Awards. Accreditations for hospitals: Understanding the process of getting started on the road to accreditation, National and International Accreditation bodies, overview of standards- ISO (9000 & 14000 environmental standards), NABH, NABL, JCI, JACHO.

Hospital Information System: Hospital Information System Management and software applications in registration, billing, investigations, reporting, ward management and bed distribution, medical records management, materials management and inventory control, pharmacy management, dietary services, management, information processing. Security and ethical challenges.

Inventory Control: Concept, various costs of inventory, Inventory techniques-

ABC, SDE/VED Analysis, EOQ models. Storage: Importance and functions of storage. Location and layout of stores. Management of receipts and issue of materials from stores, Warehousing costs, Stock verification.

Equipment Operations management: Hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, AMCS, outsourcing of maintenance services, quality and reliability, concept of failure, equipment history and documents, replacement policy, calibration tests, spare parts stocking techniques and polices

Biomedical Waste Management: Meaning, Categories of Biomedical Wastes, Colour code practices, Segregation, Treatment of biomedical waste-Incineration and its importance. Standards for waste autoclaving, microwaving. Packaging, Transportation & Disposal of biomedical wastes.