

COURSE NAME: DECG (Diploma in ECG Technology)

YEAR I

Course Code	Course Title
ANT12102	Basic Anatomy, Physiology and Pathology
MBL12102	Basic Microbiology
BCH12102	Basic Biochemistry
CSC14105	Fundamentals of Computer Science
ENG14102	Communication for Professionals
ANT12102P	Basic Anatomy, Physiology and Pathology (P)
MBL12102P	Basic Microbiology (P)
BCH12102P	Basic Biochemistry (P)

YEAR II

Course Code	Course Title
ANT12203	Human Anatomy and Physiology - I
PHM12201	Pharmacology
CRD12201	Clinical Cardiology
ECG12201	Instruments and Equipments
HHM12201	General Principles of Hospital Practice and Patient Care
ANT12203P	Human Anatomy and Physiology - I (P)
CRD12201P	Clinical Cardiology (P)
ECG12201P	Instruments and Equipments (P)
ECG12202P	E.C.G. Instrumentation & Maintenance- I (P)

YEAR III

Course Code	Course Title
ANT12302	Human Anatomy and Physiology - II
WCM12301	Environmental & Biomedical Waste Management
ECG12301	Pathology and Terminology
ECG12302	Electrocardiography Techniques
ECG12303	Electricity & Electrocardiogram
ANT12302P	Human Anatomy and Physiology – II (P)
ECG12302P	Electrocardiography Techniques (P)
ECG12303P	Electricity & Electrocardiogram (P)
ECG12304P	E.C.G. Instrumentation & Maintenance –II (P)
TRN12301	Hospital Training

SYLLABUS

YEAR I

BASIC ANATOMY, PHYSIOLOGY AND PATHOLOGY – ANT12102

UNITS	CONTENT
SECTION A (BASIC ANATOMY)	
1	Levels of Organization of Organisms: Structural levels of Organization; Chemical level; Cellular level; Tissue level; Organ level; System level; Complete organism; The Chemical level - Definition and brief discussion of atom & molecule; The cell overview about—Its structure, major cell organelles, plasma membrane & cell division; Tissue - Brief discussion about the types of tissues in the body; Organ - Brief discussion about- Major organs in the body; Organ system - Meaning and definition; Types of Organ System; Overview of Muscular, skeletal, digestive systems; Whole organism - Brief introduction about- Six recognized kingdoms of living organisms & Classification of humans.
2	Human Anatomy: Basic Terminology; introduction to anatomy; anatomical vocabulary; Relative location - skull, arm, planes, functional states; Regions- land marks, body cavities, body formation, role & functions of cell, tissue and organ in human body formation.
3	Skin and Connective Tissue: Skin - Definition of Skin; Layers of skin; Types of skin; Functions; Connective tissue - Definition; Brief discussion on – Bone, Cartilage, Embryonic connective tissue-Mesenchyme; Mucous or mucoid.
4	Skeletal System: The skeletal system; bone structure; bone cells; bone marrow; bone growth; ossification; and epiphyseal plates of bone.
5	Joints: Introduction to joints; categories of joint; joint movement.
6	Muscular System: Overview; Muscular system anatomy - origin and insertion, function, muscle tissue types, microanatomy shape of muscle, muscle contractions.
7	Cardiovascular System: Definition and meaning of Cardiovascular system; Types of blood vessels; General structure and Functions of Artery, Vein, and Capillaries & Sinusoids; Anastomosis - definition and function; Circulation – Brief discussion; Types of Circulation - Systemic and Pulmonary.
8	Lymphatic System: Introduction to lymphatic system; lymphatic capillaries; lymphatic vessels; lymph nodes; lymphatic organs.
9	Surface Anatomy: Definition of Surface Anatomy; Significance of Surface marking; Four techniques for examining body - visual inspection, palpation, percussion and auscultation.
SECTION B (BASIC PHYSIOLOGY)	
10	Introduction: Introduction to human Physiology; Definition; Difference between human anatomy and physiology; Structure and functions of cytoplasmic organelles; Reproduction – Meiosis, Mitosis, Endocytosis and Exocytosis, Homeostasis.
11	Physico-chemical Laws: Diffusion; osmosis; bonding; filtration; dialysis; surface tension; adsorption; colloid.
12	Fundamentals of Different Organ Systems: Cardiovascular system; Respiratory system; Digestive system; Excretory system; Reproductive system; Endocrine system; Lymphatic system; Nervous system.
13	Blood: Composition of blood; functions of blood; plasma proteins; RBC – Erythropoiesis; pathological and physiological variations of RBC; Hemoglobin – structure, function and metabolism; WBC – structure, types and function, Platelets, coagulation of blood, anticoagulants, bleeding disorders. Blood groups and Rh factor.
14	Cerebrospinal Fluid: History; Functions; circulation; production; composition; pathology and laboratory diagnosis.

15	Sense Organ: Physiology of sense organs – taste, olfaction, vision and hearing.
SECTION C (BASIC PATHOLOGY)	
16	Introduction to Pathology: Introduction to general pathology; the cell in health and disease; Inflammation - acute and chronic, derangement of body fluids and electrolytes - types of shocks, Ischaemia, Infection, Infectious diseases, Disease of infancy and childhood, Neoplasia- Etiology and Pathogenesis.
17	Different Branches of Pathology: Introduction to various branches of pathology; Overview of systemic pathology, cytopathology, histopathology, hematology, blood banking, clinical pathology and Immunopathology.
18	Laboratory Management: Collection of sample, labeling, transport, screening, reporting and dispatch of reports, Hb estimation, TLC and DLC, RBC count; Peripheral blood film - staining and study of Malaria parasite.

BASIC ANATOMY, PHYSIOLOGY AND PATHOLOGY (P) –
ANT12102P

1. Histology
 - a) Introduction to Histotechniques
 - b) Introduction to Microscope
 - c) Epithelium
 - d) Histology of Skeletal muscle
2. Osteology
 - a) Appendicular skeleton
 - b) Axial skeleton
3. Specimen
 - a) Cell
 - b) Joint
 - c) Muscle
 - d) Blood vessel
4. Identify compound microscope and its components.

5. Blood sample collection: Requirements.
6. Demonstration on Hemocytometer.
7. Requirements for Erythrocyte Sedimentation Rate (ESR) and Packed Cell Volume (PCV) estimation.
8. Hemoglobinometer and Identify its components.
9. Demonstration on requirements of BP measurement.
10. Requirements to prepare a peripheral blood smear & Differential Leukocyte Count (DLC).
11. Requirements for blood group determination.
12. Requirements to determine bleeding time and clotting time.

BASIC MICROBIOLOGY – MBL12102

UNIT	CONTENT
1	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 and its preventive measures.
2	Cell Structure & Function: Definition, structure and function of cell; Types of cells- prokaryotic & eukaryotic cells; Structure and function of eukaryotic & prokaryotic cell; Distinguishing features between; Eukaryotic cell & prokaryotic cell.
3	Structure of Bacteria: Definition & structure of bacteria; Types of bacteria; Classification of bacteria on the basis of shapes; Structure of Gram positive and Gram negative bacteria with special reference to cell wall.
4	Common Equipments used in Microbiology Laboratory: Introduction to common equipments; Types of equipments used in microbiology laboratory; Principle and uses of Incubators, Hot air Oven, Water Bath, Anaerobic Jar, Centrifuge, Autoclave, Microscope; Glassware-description of glassware, its use, handling and care; Safety measures in handling microbiology equipments.
5	Concept of sterilization: Meaning, definition & role of sterilization; Classification & uses of sterilization; General principle of sterilization.
6	Antiseptics and Disinfectants: Meaning, definition & uses of antiseptics & disinfectants; Types & mode of action.
7	Laboratory Management and Planning: Introduction to Laboratory management & planning; Basic definition of management and planning; Concept of laboratory management; Recording of specimen and maintenance of laboratory records, care & maintenance of glassware; Safety measures in microbiology laboratory with universal safety precaution.
8	Collection & Transportation of Specimen for Microbiological Investigation: Introduction of collection & transportation of specimen; Rules for collection & transportation of specimen; Methods of collecting different samples- blood, urine, faeces, sputum, pus, body fluids, swab; Methods of preservation, types of container & criteria for rejection of specimens.
9	Disposable of Laboratory/Hospital WASTE: Definition of hospital waste; Identification of all types of waste treatment; Noninfectious waste; Infected sharp waste disposal; Infected non sharp waste disposal.

BASIC BIOCHEMISTRY – BCH12102

UNIT	CONTENT
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1	Introduction to Biochemistry: General introduction and role of biochemist, ethics, responsibility, safety measures and first aid; Cleaning and care of general laboratory glassware and equipment; Distilled water - types of distilled water plants, preparation & storage.
2	The Cell: Introduction of cell; prokaryotes and eukaryotes; the cell membrane; cytoplasm; fluid mosaic model of cell membranes; membrane proteins; the nucleus (nuclei); mitochondria; ribosomes; endoplasmic reticulum (er); golgi apparatus; centriole; plant cell structures; and Multicellular organization.
3	Carbohydrates: Chemical structure; function; Classification – monosaccharides, disaccharides, polysaccharides, homopolysaccharides, heteropolysaccharides, and glycoproteins.
4	Proteins: Amino acids; Classification; Structure of protein; Determination of protein structure; Properties of proteins; Denaturation; Classification of proteins; Atigen; Antibody types of plasma proteins; Blood clotting.
5	Lipids: Chemical structure; functions; classification - fatty acids, triacylglycerols, phospholipids, glycoproteins, lipoproteins, steroids, amphipathic lipids.
6	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.
7	Nucleic Acids & Enzymes: Definition of DNA; Nucleic acids- structure of DNA, Watson & Crick model of DNA; Types of RNA; Enzyme definition – nomenclature, classification, Factors affecting enzyme activity, active site, co-enzyme, mechanism of enzyme action, enzyme pattern in diseases.

DIPLOMA IN ECG TECHNOLOGY–3 YEARS

8	Analytical Balance & Standard Solutions: Introduction to analytical chemistry; definition and principle of analytical balance; working and maintenance; preparation of reagents; formulation and preparation; vented balanced safety enclosure; various standard solutions used their preparation; storage of chemicals.
9	Units of Measurements: S.I units – definitions, conversions, measurement of volume strength; Normality; molarity; molality; volumetric apparatus - calibration of volumetric apparatus; Definition – mole, molar and normal solutions (preparation, standardization), pH (definition, PKa value, example, derivation of Henderson – Hasselbach equation); Buffer solutions (definition, preparation of important solutions); pH indicators (pH papers, universal & other indicators); pH measurement – different methods (ph paper, pH meter, principle of pH meter, structure, working and maintenance.
10	Radio Isotopes: Introduction to isotopes and radio isotopes; uses of isotopes and radio isotopes in biochemistry; radio isotopes properties; isotope v/s nuclide; radioactive displacement law; alpha decay and beta decay.

FUNDAMENTALS OF COMPUTER SCIENCE – CSC14105

UNIT	CONTENT
1	Computer Application: Introduction to Computer - Advantages of computers, Limitations of computers, Application of Computer in Different Fields of Life, Computer Generations, and Classification of Computers; Characteristics of computers; Computer System; Input Unit; Output Unit; Central Processing Unit; Storage or Memory Unit - Primary Storage or Main Memory (MM), Memory Unit – Secondary Storage.
2	Computer Organization: Overview of Computer Organization; Central Processing Unit; Control Unit; Arithmetic Unit; Instruction Set - Difference between RISC and CISC; Register; Processor Speed - Higher is not Always Better, Keep-up with Technology, Price is not

DIPLOMA IN ECG TECHNOLOGY-3 YEARS

	Everything.
3	Memory: Overview of Storage Devices; Main Memory; Storage Evaluation Criteria - Access Time, Memory Cycle Time, Effective Access Time; Memory Organization - Addressing Strategies, Organization of Memory Units, Content-Addressable Memories; Memory Capacity; Random Access Memories; Read Only Memory; Secondary Storage Devices; Magnetic Disk; Floppy and Hard Disk - Floppy disk drive, Hard Discs; Optical Disks CD-ROM - Compact disk, DVD, Blu-Ray disk, HD-DVD; Mass Storages Devices; and Differences between the Primary and Secondary Memory.
4	Input Devices: Keyboard; Mouse; Trackball; Joystick - Joystics in aviation, Joystics in Gammng, Analog Joystick, Digital Joystick; Scanner - Characteristics of a scanner, Types of scanner; Optical Mark Reader; Bar-code reader - Types of barcode; Magnetic Ink Character Reader (MICR); Digitizer; Card reader; Voice recognition; Web Cam; and Video Cameras.
5	Output Devices: Monitors - Characteristics of VDU, Types of VDU; Printers; Dot Matrix Printers; Inkjet Printers; Laser Printers; Plotters; Computers Output Micro Files (Com) - COM to CD Service, What Are the Benefits of COM?; Multimedia Projector - Criteria to evaluate suitable Projector.
6	Operating System: Microsoft Windows - An Overview of different version of windows, Basic Windows Elements, File Management through Windows 7; Using Essential Accessories - Disk Cleanup and Disk Defragmenter, Entertainment, Calculator, Note pad, Paint, Wordpad, Recycle Bin, Windows Explorer, and Creating Folder Icons.
7	Word Processing: Word Processing Concepts; Working with Documents - Create a New Document, Opening an Existing Document, Saving a Document, Renaming Documents, Working on Multiple Documents, Document Views, and Close a Document; Working with Text in Word - Selecting text, Editing Text, Finding and replacing text; Printing Documents; Formatting - Bullets and Numbering in Word, Alignment, Page designs and Layout, Editing and Proofreading; Working With Graphics - Inserting Clip Art Images, Moving Images in Word, Deleting images in Word, Text wrapping in Word, Creating Lines and Arrows in Word, Drawing Shapes in Word, Adding a Text Box; Working with Tables.
8	Presentation Package: Creating a New and Opening an Existing Presentation; Creating the look of your Presentation; Working with Slides - Adding and formatting Text, Formatting PowerPoint; Printing Handouts with Notes making; Images and Clip Art; Slide Shows.
9	Internet and Email: Definition about the World wide web & brief History; Use of Internet and Email – Internet, Email; Internet – Terminology, Protocols, Routing; Websites; The Mail Protocol Suite; Using Search Engine and beginning Google search; Exploring the next using Internet Explorer and Navigator; Uploading and Downloading of Files and Images; E-mail ID creation - Opening the E-mailbox, Sending Messages, and Attaching Files in E-mails.
10	Hospital Information System: Hospital Information System; Architecture of a Hospital Information System; Aim and Uses of HIS - Aim of HIS, Uses of HIS; Types of HIS; Benefits of using a Hospital Information Systems; Advanced Hospital Management System - XO Hospital Management System, LCS Hospital Management Information System, NVISH Hospital Management System.

COMMUNICATION FOR PROFESSIONALS – ENG14102

UNIT	CONTENT
1	Essentials of Grammar: Parts of Speech; Vocabulary building; Sentence; Articles; Pronouns; Quantity; Adjectives; Adverbs; Prepositions, Adverb particles and phrasal verbs, Verb; Verb tenses; Imperatives; Active and passive voice; Direct and indirect speech; The infinitive; Conditional sentences; Synonyms and antonyms; Singular and Plural; Figures of Speech; Punctuation and Phonetics.
2	Nature, Scope and Process of Communication: Defining Communication; Nature of Communication; Objectives/Purpose of Communication; Functions of Communication; Process of Communication; Elements of Communication Process; Process of Communication: Models; Working of the Process of Communication; Forms of Communication.
3	Channels and Networks of Communication: Channels of Communication; Communication Flow in Organizations: Directions/Dimensions of Communication; Patterns of Flow of Communication or Networks; Factors Influencing Organizational Communication.
4	Principles of Effective Communication: Communication Effectiveness: Criteria of Evaluation; Seven Cs of Effective Communication; Four Ss of Communication.
5	Barriers in Communication: Categorisation of Barriers; Semantic Barriers; Organizational Barriers; Interpersonal Barriers (Relating to Superior-subordinate); Individual or Psychosociological Barriers; Cross-cultural/Geographic Barriers; Physical Barriers/Channel and Media Barriers; Technical Aspects in Communication Barriers; Overcoming the Barriers in Communication; Measures to Overcome Barriers in Communication.
6	Non-verbal Communication: Characteristics of Non-verbal Communication; Relationship of Non-verbal Message with Verbal Message; Classification of Non-verbal Communication.
7	Oral Communication: Informal Conversation: Oral Communication; Informal Conversation; Learning Informal Conversation; How to Go About Learning Other Tricks?; Learning Conversational Skills; Internet Chat.
8	Communication in Business Organizations: Meaning of Business Communication; Types of Information Exchanged in Business Organizations; Role of Communication in Business Organizations; Importance of Communication in Management of Business Organizations; Scope of Communication in Organizational Setting; Characteristics of Effective Business Communication; New Communication Environment; Ethical challenges and Traps in Business Communication; Role of Communication in Three Managerial Roles Defined by Henry Mintzberg.
9	Formal Conversations: Meetings, Interviews and Group Discussions: Meetings; Duties of Participants; Interviews; Group Discussions.
10	Greetings and Introduction: Basics of greetings and introduction; formal and informal introduction; Reading comprehension, Vocabulary; Pronunciation: Falling and rising tone; Speaking: Body language; Listening: body language.
11	Listening Skills: Importance of Listening; Listening versus the Sense of Hearing; Listening as Behaviour; Payoffs for Effective Listening; Actions Required for an Effective Listener; Approaches to Listening; Misconceptions and Barriers that Impair Listening; Planning for Effective Listening; How to be a Good Listener?; What Speakers can do to Ensure Better Listening?.
12	Formal and Informal Letters: Distinction between Formal and Informal Letters; Writing Formal Letters; Informal Letters.
13	Communication on the Net: E-Mail; Netiquettes; Blog Writing; Web Writing.
14	Report Writing: Business Reports: Significance; Types of Reports; Five Ws and one H; Report Planning; Report Writing Process; Outline of a Report; Guidelines for Writing Report; Technicalities of Report Writing; Visual Aids in Reports; Criteria used for Judging the Effectiveness of a Report; Illustrations.
15	Job Applications and Resume Writing: Job Application/Covering Letter; Resume/CV Writing.

YEAR II**HUMAN ANATOMY AND PHYSIOLOGY –I – ANT12203**

UNIT	CONTENT
1	General Anatomy: Organization of Organisms; Cell - Structure and Function; Tissue - Classification and Function; Human Anatomy - Introduction; Subdivisions of anatomy; Anatomical nomenclature - Terms of position, location and fundamental planes, Clinical terms; General Histology - Definition and meaning; Slide preparation – Fixing, Chemical fixation with formaldehyde or other chemicals; Processing - Dehydration, clearing, and infiltration; Embedding; Sectioning; Staining; Common laboratory stains.
2	Skin and Connective Tissue: Skin - Definition of Skin; Layers of skin; Types of skin; Functions; Dermatome; Connective tissue - Definition; Brief discussion on Types: Connective tissue proper (general and Specific), General Definition - Bone, Cartilage and Blood, Embryonic connective tissue - a) Mesenchyme & b) Mucous or mucoid.
3	The Skeletal System: Brief discussion over skeletal system; Classification of skeleton - axial and Appendicular; brief discussion over bone structure, bone cells, bone marrow, bone growth, ossification, parts of a long bone; Major components of skeleton system: a) Bone- definition, synonym, Composition, Special features & Function, Classification, features of a long bone, Bone marrow; b) Cartilage-definition; Components and classification - Overview of Osteology of bones of: i) Upper limb - Clavicle, Scapula, Humerus, Radius & Ulna and carpals; ii) Lower limb - Femur, Patella, Tibia & Fibula and tarsals; iii) Thorax (sternum & ribs); iv) Abdomen-Pelvis; v) Skull bones - Cranial bones (Frontal, Parietal, Temporal, Occipital); Facial bones - (Maxilla and Mandible) - their position, orientation, side determination & ligaments attached – Joints - Definition of Joints, Functions, Classification of Joints based on – Structure and Function.
4	The Muscular System: Brief introduction of muscular system; muscle tissue types; General review of skeletal muscles - Brief knowledge of Appendicular muscles & Axial muscles.
5	The Circulatory System: Brief discussion about basics of circulatory system; The Heart - General features of Heart, Shape and Size of Heart, Position of heart, General overview on-mediastinum and relations of heart, Pericardium, Layers of heart - epicardium, myocardium and endocardium, Cardiac muscles, Chambers of heart and associated blood vessels, Valves of heart, Blood supply of Heart, vessels related to heart, Conduction system of heart, Functions of heart; Lymphatic system - Introduction to lymphatic system, brief overview of lymph nodes & lymphatic organs.
6	The Respiratory System: General discussion of respiratory system - Cellular respiration, Brief knowledge of classification of respiratory system; upper conducting part & lower respiratory part; Brief discussion over anatomy of – Larynx, trachea and bronchial tree; Lungs - Anatomical position, relations, lobes, fissures, broncho-pulmonary segments, Pleura - Layers of pleura and Pleural cavities; Microscopic anatomy of Trachea & Lungs.
7	General Physiology: Introduction to Physiology – Meaning, Homeostasis, Cell, Body fluid, Transport through cell membrane - Passive Processes; The Principle of Diffusion; Simple diffusion; Facilitated diffusion Osmosis; Active Processes - Active Transport; Transport in Vesicles; The Primary Tissue; Organs and systems.
8	Blood: Red blood cells – Erythropoiesis, stages, differentiation, Functions, Blood cells count, variations; Hemoglobin – Structure, function, concentration, physiological variation, Methods of estimation of Hb; White blood cell – Production, function, life span, count, differential count; Platelets – Origin, normal count, morphology, functions, Coagulation, Coagulants & anti-coagulants; Blood groups - A, B, O system, Blood grouping and typing, Cross-matching, Rh system, Rh factor, Rh in cross matching; Blood transfusion – indication, universal donor and recipient concept; Selection criteria of blood donor; Disorders of white blood cells, Platelets and Clotting.
9	Gastrointestinal System: Physiological anatomy of GIT; Digestion of food in the mouth (mastication), stomach, and intestine; Absorption of nutrients from digested food; Role of bile in

	the digestive process.
10	Respiratory System: Respiratory system physiology; Introduction; measurements of respiratory rates and volumes; gas laws; gas exchange; oxygen and carbon dioxide transport in the blood.
11	Nerve muscle Physiology: Resting membrane potential; Action Potential - Physiology of nerves and neuromuscular junction, Neuro muscular transmission; Overview of muscular system - Muscle Physiology, Muscle fiber, Muscle contraction, the sliding filament model of muscle contraction; Involuntary muscles - Cardiac and smooth muscles.
12	Cardiovascular and Lymphatic System: Introduction; Cardiac muscle; the cardiac conducting system; The electrocardiogram - ECG and applied physiology; Cardiac output; Blood pressure - Control, fluid volume and blood pressure; Coronary circulation and applied physiology; Introduction to the lymphatic system - lymph, lymphatic circulation, and functions of lymph.

DIPLOMA IN ECG TECHNOLOGY-3 YEARS

PHARMACOLOGY- PHM12201

UNIT	CONTENTS
1.	Cardiac Drugs: ACE Inhibitors; Angiotension Receptor Blockers; (Beta) Blockers; Diuretics; A-antagonists; Sympatholytics central; Calcium channel blockers; Vasodilator; Quinidine; Procanamide; Amiadarone; Digoxin; Adenosine.
2.	Effect of Drugs on ECG change.
3.	Toxicity of drugs & ECG changes.

CLINICAL CARDIOLOGY- CRD12201

UNIT	CONTENTS
1.	ECG: Introduction & History of ECG.
2.	Cardiac Electrical Activity: ECG (Electrocardiogram); Anatomic orientation of heart; Cardiac cycle; Cardiac impulse formation & Conduction; Recording long axis cardiac electrical activity; Recording short axis cardiac electrical activity.
3.	Recording the Electrocardiogram: Evolution of frontal plant leads; Transverse plane leads; Correct & Incorrect lead placement; Electrocardiography lead placement; Display of 12 standard electrocardiogram leads.

DIPLOMA IN ECG TECHNOLOGY-3 YEARS

4.	ECG Measurement: In perpetration of Normal ECG; Electrocardiographic features; Rate & regularity; P wave; PR interval; QRS complex; ST segment; T wave; U wave; QTC interval; Cardiac rhythm; Internal measurement; Horizontal measurement; Vertical measurement; ECG wave's interval & segments.
5.	Heart Rate: Introduction, Measuring of heart rates using caliper.
6.	Electrical Axis: Determining electrical axis, Normal axis, RAD, LAD; Methods of electrical axis estimation.
7.	Assessment of Arrhythmias: Supraventricular v/s ventricular rhythms; Rhythmic Disorders.
8.	CAD: CAD (Coronary Artery Disease); Effects of MI injury & infarction on ECG; Manifestation of Q wave infarction; Manifestation of non-Q wave infarction; Anterior infarction; Antero-Lateral infarction; Inferior infarction.
9.	Chamber Enlargement & Hypertrophy: Conduction defect; AV block First degree; AV block Second degree; AV block Third degree; AV block Bundle; Branch Block; RBBB; LBBB Chamber enlargement; RAE LAE; Hypertrophy; Right ventricular hypertrophy; Left ventricular hypertrophy and Biventricular hypertrophy.
10.	Clinical Disorder: Miscellaneous, Pericardial effusion; Hyperkalemia; Hypokalemia; Electrode misplacement; Pericarditis; Hypercalcemia; Hypocalcemia.
11.	Reporting: ECG Reporting.

INSTRUMENTS & EQUIPMENTS- ECG12201

UNIT	CONTENTS
1.	Surgery and Instruments: Common manifestation and management of patient ECG interventions; Cleft lip & palate; Acute appendicitis; Urethral strictures; Different Surgical Instrument; Instruments used in major surgical operations including Biliary Tract Surgery, Anorectic Surgery, Urological Surgery, and Orthopedic Surgery Instruments.
2.	Sterilization and Disinfections in O.T: General Surgical Principles and Instruments; The

DIPLOMA IN ECG TECHNOLOGY-3 YEARS

	surgical patient operation room technique; Surgical Instruments- Instruments used for preparing Surgical Cheatles forceps, Rampleys sponge, Holding forceps, Mayo's towel clip, Esmarch bandage, Simple tourniquet, Pneumatic tourniquet; Incision making method and Instruments- Bard parker knife handle, Major abdominal incision, Artery forceps and their types, Instruments used in homeostasis, Kocher's forceps and Electrocautery; Retractor-Single hook retractor, Czerny's retractor's, Nerve hooks retractor, Morris retractors, Deaver's retractors.
3.	Equipments and Machinery: Care, Washing, Sterilization and Maintenance of Endoscopic Instruments; Orthopedic Power instruments; Advanced OT tables & their attachment;Types setting & Use of Image Intensifier Portable X-ray Machine, Cautery Machine, suction machine, Pulse oxymeter, cardiac monitor.
4.	Wound Management: Scissors and its types; Sucking material and techniques; Disinfectants and Irritant dressing procedures; Different types of bandages; Surgical needle & needle holders; Various types of suture material.

GENERAL PRINCIPLES OF HOSPITAL PRACTICE AND PATIENT CARE –
HHM12201

UNIT	CONTENT
1	Hospital Structure and Organization: Overview of hospital structure, hospital procedure, professional qualities; Communication and relational skills –development of appropriate communication skills with patients, verbal and non verbal communication, appearance and behavior; Professional attitude of the technologist to patients and other members of the staff; Records and reports – records relating to patients and departmental statistics; Minimizing waiting time out- patient and follow-up clinics, stock-taking and stock keeping; Administrative policies and disciplinary procedures; Importance of reporting.
2	Care of Patient: Contact with the patient and family members in the respective department; Communication with the patient and family members; Patient transfer technique; Restraint techniques – consideration to be taken for the geriatric, paediatric, trauma, emotionally disturbed, and anaesthetized patients; Specific patient conditions – essentials of care of patients on ventilator, tracheostomy, tubes and catheters, nasogastric tubes, chest tubes, intravenous lines, oxygen & casts; Basics on hygiene and maintenance of hygiene; Essential care of patient with a colostomy, providing bed pans and urinals; Basics of nursing care –

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	measurement of vital signs – sterile dressing.
3	First Aid and Basic Life Support: Aims and objectives of first aid; wounds and bleeding, dressing and bandages; pressure and splints, supports etc. shock; insensibility; asphyxia; convulsion; resuscitation, use of suction apparatus, drug reactions; prophylactic measures; administration of oxygen; electric shock; burns; scalds; haemorrhage; pressure points; compression band. Fractures; splints, bandaging; dressing, foreign bodies; poisons. Introduction to BLS, indications for BLS, and the process of BLS. Recovery position.
4	Infection Control Practices: Definition – introduction to the types of micro organisms – Bacteria – their nature and appearance – spread of infections – auto-infection or cross infection; asepsis and antisepsis; Infection pathogens; Communicable diseases cross infection and prevention, patient hygiene, personal hygiene, departmental hygiene, handling of infectious patients in the department; Application of asepsis, inflammation and infection process; Hospital acquired infection; Universal precautions and biomedical waste management.
5	Principle of Asepsis: Sterilization – methods of sterilization; use of central sterile supply department of instruments, surgical dressing in common use including filamented swabs, elementary operating theatre procedure, general abdominal preparation, clothing of a patient.
6	Maintenance of Medications in the Department: Storage: classification; labeling and checking, regulations regarding dangerous and other drugs; units of measurements, special drugs, anti-depressive, anti-hypertensive etc.
7	Specialized Investigations: Care of patients - patients care during investigation; GI tract, renal tract, biliary tract, respiratory tract, gynecology, cardiovascular, lymphatic system, CNS.
8	Medico – Legal Issues: Medico – Legal considerations – clinical and ethical responsibilities, ethical law and professional etiquettes applied to members of profession associated with medicine, misconduct and malpractice; Handling female patients, practice in pregnancy – decision making.
9	Nursing, Handling and Care of Patients: Hospital and developmental procedure; Hospital staffing and organization, records and departmental statistics, appoints, stock taking and stock keeping, reception, elementary hygiene.

DIPLOMA IN ECG TECHNOLOGY–3 YEARS

YEAR III**HUMAN ANATOMY AND PHYSIOLOGY – II – ANT12302**

UNIT	CONTENT
SECTION A (HUMAN ANATOMY)	
1	The Digestive System: The Digestive system – Overview of digestive system, functions of digestive system; The alimentary canal or GI tract (gastrointestinal tract) - Mouth, Pharynx, Esophagus, Stomach, Small intestine, Large intestine & Rectum and Anus; Accessory digestive organs – Tongue, Teeth, Salivary glands, Liver, Gallbladder, and Pancreas; Histology - Esophagus, Liver, and Pancreas.
2	The Uro-Genital System: Kidney - Nephron, histology of kidney; Ureters; Urinary bladder, urethra; The Genital System – brief discussion and anatomy; Male reproductive system – primary reproductive organs, secondary or accessory reproductive organs; Female reproductive system – primary reproductive organs, secondary or accessory reproductive organs; Histology – Testis, and Ovary.
3	The Nervous System: Broad classification of nervous system; neurons and glial cells; central nervous system – brain, spinal cord; Peripheral nervous system – cranial nerves, spinal nerves; Histology – spinal cord, and cerebrum.
4	The Endocrine System: Anatomy of pituitary gland – hormones of the pituitary gland; Anatomy of thyroid – Hormones of thyroid; Parathyroid gland – parathyroid hormone; Adrenal gland – hormones of the adrenal glands.
5	The Special Senses: Overview of special senses; chemical senses – olfaction, taste; physical senses – vision, ear; Anatomical overview of sense organs – eye, ear, nose, and tongue.
6	Radiological Anatomy: Properties of X-rays; Radiographic views and procedures – Fluoroscopy, CT scanning, Ultrasound, and MRI (Magnetic Resonance Imaging); X-rays of skeleton; Drugs used in radiology; Radiographic Examination - Alimentary tract, kidney and gall bladder.
SECTION B (PHYSIOLOGY)	
7	Excretory system: Body fluid compartments - Intracellular fluids, Extracellular fluids, interstitial fluid and edema; Urine formation by the kidney - Renal blood flow, Tubular processing; Diuretics and kidney diseases; Micturition – Cystometrogram; Excretory functions of skin.
8	Fluids, Electrolytes and Acid-base Balance: Regulation of ECF osmolarity and sodium concentration; Renal regulation of ECF and blood volume; Renal regulation of potassium, calcium, phosphate, and magnesium – Regulation of potassium balance, Regulation of calcium balance, regulation of phosphate, regulation of magnesium; Acid base balance – Proximal tubular mechanism, and distal tubular mechanism.
9	Endocrine System: Endocrine glands and their mechanism of hormonal function; The hypothalamus; Pituitary gland; Adrenal glands; Thyroid gland; Parathyroid gland; Pancreas; Testis and Ovary.
10	Reproductive System: Physiology of male reproductive system – Seminal fluid, spermatogenesis; Physiology of female reproductive system; Oogenesis; The ovarian cycle and the menstrual cycle; Gestation – Pregnancy tests and contraceptives; Lactation – composition of milk, advantages of breast feeding.
11	Nervous System: Functional anatomy of nervous system - neurons, neuroglia, nerves, and flows of information from neuron to neuron; Cerebrospinal fluid (CSF) – functions of CSF, formation and flow of CSF, significance of CSF analysis; Physiology of spinal cord – Reflexes; Functions of brain; functions of autonomic nervous system.
12	Special Senses: Physiology of sense organ; Traditional senses - Hearing, Taste, Smell, Touch, and Vision; Other senses - Balance and acceleration, Temperature, kinesthetic sense, pain.

ENVIRONMENTAL & BIOMEDICAL WASTE MANAGEMENT-WCM12301

UNIT	CONTENTS
1.	Environment Introduction: Biotic and Abiotic environment; Adverse effects of Environmental Pollution; Control Strategies; Various Acts and Regulation.
2.	Water Pollution: Water Quality Standards for potable water; Surface and underground water sources; Impurities in water and their removal; Denomination; Adverse effects of domestic waste water and industrial effluent to surface water sources; Eutrophication of lakes; Self purification of streams.
3.	Air Pollution: Sources of air contaminations; Adverse effects on human health; Measurement of air quality standards and their permissible limits; Measure to check air pollution; Greenhouse effect; Global warming; Acid rain; Ozone depletion.
4.	Bio Medical Waste: Bio Medical Waste Management; Introduction to bio medical waste; Types of bio medical waste; Collection of bio medical waste.
5.	Land Pollution: Land Pollution; Soil conservation; Land erosion; Afforestation.
6.	Ecology: Ecology; Basics of species; Population dynamics; Energy flow; Ecosystems; Social Issues and the Environment; Sustainable development and Life Styles; Urban problems related to energy; Resettlement and Rehabilitation of people; Energy flow; Consumerism and waste products. Water Harvesting and Rural Sanitation - Water harvesting techniques, Different schemes of Rural Water Supply in Rajasthan, Rural Sanitation, Septic Tank, Collection and disposal of wastes, Bio-gas, Community Awareness and participation.
7.	Renewable Sources of Energy: Non-Conventional (Renewable) source of energy; Solar Energy; Wind energy; Bio mass energy and Hydrogen energy.

DIPLOMA IN ECG TECHNOLOGY-3 YEARS

PATHOLOGY AND TERMINOLOGY- ECG12301

UNIT	CONTENTS
1	<p>Introductory Pathology: Cellular adaptation and cell death, Inflammation and repair, Infection, Circulatory disorders, Immune defense, Genetics of disease, Neoplasia, Cell injury and adaptation, Atrophy, Hypertrophy, Metaphase, Hyperplasia, Classification of tumors, Premalignant lesion.</p> <p>Types of inflammation & system manifestations of inflammation, Disorders of vascular flow & shock (Brief introduction), Oedema, Hyperemia or Congestion, Thromboses, Embolism, Infarction shock, Ischemia, Over hydration and Dehydration.</p> <p>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.</p>
2	<p>Fundamentals of Medical Terminology: Common Diseases & Procedures; Gastro intestinal; Cholecystitis; Cholelithiasis; Appendicitis; Intestinal Obstruction; Hernia; Peritonitis; Gastro copy; Endoscopy; Laparotomy; Laparoscopy; Common Diseases & Procedures; Respiratory Tuberculosis; Bronchial Asthma; Respiratory Failure; Pulmonary Emboli son; Pneumonia; Bronchoscope; Pulmonary Function test; Cardio-Pulmonary; Resuscitation.</p>
3	<p>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.</p> <p>Pathology - Urinary Tract Infection, Renal/Bladder Stones, Intravenous Pyelography, Cystoscopy, Urinalysis, Haemodialysis, Peritoneal Dialysis, Nervous, Stroke (Cerebro Vascular Accident), Brain Tumor, Brain Injuries, Spinal Cord Injuries, Lumbar Puncture, Myelography, CT Scan, MRI, EEG, EMG, Oncology, Investigations, Tumor markers, RECIST Criteria for response evolution.</p>
4	<p>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,</p> <p>Unstable angina, Prinzmetal's angina, ST-elevation and non-ST elevation myocardial infarction, Acute coronary syndrome, necrosis, Hypertension, Atrial and Ventricular septal defects, Cyanosis, Coarctation of the aorta, Valvular stenosis and regurgitation, Pericarditis.</p>

ELECTROCARDIOGRAPHY TECHNIQUES- ECG12302

UNIT	CONTENTS
1	Introduction to Electrocardiography: History; psychological basis of E.C.G. conduct; Velocity; Electrophysiology; Central of Wilson augmentation Esophagea; lead Pathway of Activation; Vector Concept.
2	Normal Electrogram: Atrial complexes; P-R interval; QRS Complex S.T. Segment T-Wave U-wave Q-T- interval; Electrical Axis; Heart Position Interpretation of an ECG; How to record and ECG.
3	Abnormal Electrocardiogram: Abnormal P-Wave Intraventricular Conduction Defect; RBBB; LBBB; Incomplete LBB; LAHB; LPPHB; Non specific Interventricular Conduction; Defect Bilateral Bundle; Branch Block; Trifasicular Block; WPW Syndrome; LLawn ganogn; Levine Syndrome; Mahim by Pass Hypertrophy; Right Ventricular Hypertrophy (RVH); Pulmonary embolism; Chronic Obstructive lung Disease (COLD); Biventricular Hypertrophy; Overload Concept; Diastolic Overload.
4	Coronary Artery Diseases: Ischemia Injury; infracting; subtle; atypical; non specific Pattern conduction; defects and infraction; localization of infraction; vpm and acute myocardial infarction; atrial infraction; VCG in myocardial; coronary insufficiency
5	Exercise Test: Type of exercise test; termination exercise; guanidine effect; phenothiazine; Anthracylines; cerebrovascular accident; hypothermia; pericarditis; myocarditis neuromuscular disease; heart trauma malignancy involving heart electrical alter nana negative vales; liquid protein diet; anemia etc.
6	Disorder of Cardiac Rhythm: Disturbance of impulse formation; Disturbances of impulse conduction; Secondary disorders of rhythm; Physiology of cardiac rhythm; Automacity conductivity A-V nodes; Sinus rhythm; Sinus tachycardia; Sinus bradycardia; Sinus arrhythmia; Sino atrial block; Partial Sa block; Complete SA block; Causes of Exit block; Atrial extrasystoles; Blocked atrial; Premature beats; Cause of Atrial Tachycardia (PAT) Chaotic Atrial Rhythm; Atrial flutter; Atrial fibrillation; Supraventricular tachycardia (SVT); Ventricular rhythm; Ventricular Tachy Cardia (VT); Ventricular Fibrillation Proarrhythmia; Parasystole, Group beating; AV-Dislocation, torsade de points, Sick sinus syndrome.
7	Abnormality: ECG as a clue to clinical diagnosis; Pulmonary stenoris tricuspid tatesia atrial spetal defect; Ventricular spetal defect; Ebstein anomaly; Correct transportation of great vessel mirror image; Dextrocaridism; Anomalous origin of left cornaro artery; Rheumatic fever; Mitrial value; Prolapsed athlete's heart; Cardiac pacing act.

ELECTRICITY & ELECTROCARDIOGRAM- ECG12303

UNIT	CONTENTS
1.	Circuits and Units: Simple electron theory of conductions; Resistance; The Joule; The watt; Properties of electric charge; Capacitor; Electronic potential/potential difference (PD); Type of AC/DC; and Basics of AC Circuits.
2.	Electro Magnetism: Magnetism/ Electro Magnetism/Electromagnetic Induction; Magnetic poles/ fields/ flux and influx density; Magnetic field due to a straight and circular coil wire; Relationship of the electrocardiogram to the electrical events of the heart; Relationship of the electrical events to the mechanical events of the cardiac cycle; Waveform components (P, Q, R, S, T and U); Definitions and normal ranges of PR interval and QRS duration; Measurement of QT interval and calculation of corrected QT interval (QTc) by Bazett's formula; Calculation of the heart rate from the electrocardiogram.
	Electrocardiogram: The appearance of the normal resting electrocardiogram; Recognizing the normal variations of the electrocardiogram in relation to Age; State of activity; Body built Ethnic origin. Recognizing the normal electrocardiogram and some common abnormalities - Rhythms arising from the sinus node, Normal sinus rhythm, Sinus arrhythmia, Sinus tachycardia,

3.	Sinus bradycardia, Sinus arrest, Supraventricular tachyarrhythmias, Atrial premature contractions (ectopics), Atrial tachycardia, Atrial flutter, Atrial fibrillation, Supraventricular tachycardia, Accelerated AV nodal (junctional rhythm). Conduction Abnormalities - Ventricular pre-excitation, Left and right bundle branch block, 1st degree AV block, 2nd degree AV block: Mobitz I (Wenckebach), Mobitz II and 2:1 block, 3rd degree (complete) AV block.
4.	Rhythms Arising from the Ventricles: Ventricular escape beats; Ventricular premature beats (ectopics); Ventricular tachycardia; Ventricular flutter; Ventricular fibrillation; Ventricular standstill (asystole); The electrocardiogram associated with an artificial cardiac pacemaker; Identification of pacemaker; Stimulus on the electrocardiogram; Differentiation between atrial and ventricular pacing; Interpretation of changes in the electrocardiogram arising from abnormal cardiac conditions; Myocardial ischaemia; Myocardial infarction; Left ventricular hypertrophy; Pericarditis; Dextrocardia; Essential ECG Interpretation.
5.	ECG Diagnosis: Complete heart block; Left bundle branch block; Right bundle branch block; Ventricular fibrillation; Atrial fibrillation; Ventricular tachycardia; Narrow complex tachycardia; Acute ST elevation; myocardial infarct.
6.	Aims and Objective of First Aids Wounds and Bleeding: Dressing and bandages; Pressure and splints, Supports etc; Shock insensibility; Asphyxia; Convulsions; Resuscitation; Use of suction apparatus; Drug reactions; Prophylactic; Measure administration of oxygen; Electric shock; Burns; Scalds; Hemorrhage; Pressure points; Compression band; Fracture splints; Bandaging; Dressing; Foreign bodies poisons.

