



# NIMS UNIVERSITY

SYLLABUS

OF

DIPLOMA IN ECG TECHNOLOGY – DECG12

VERSION 1.2

DIRECTORATE OF DISTANCE EDUCATION

Shobha Nagar, Jaipur-Delhi Highway (NH-11C), Jaipur- 303121  
Rajasthan, India

## DIPLOMA IN ECG TECHNOLOGY – DECG12

Eligibility	:	10+2 PCB/PCM
Programme Duration	:	2 Years
Programme Objectives	:	Electro-Cardiography Technology science combines the use of sophisticated instruments and techniques with the application of theoretical knowledge to perform complex procedures on tissue specimens, blood samples and other body fluids. The tests and procedures that electro-cardiography Technologists perform provide critical information enabling physicians to diagnose, treat and monitor a patient's condition.
Job Prospects	:	The electro-cardiography Technologists/ technician may be assigned to a specialized area of work in a large medical Heart lab. In small labs, they may perform a variety of tests or all areas of lab work. They can also work as laboratory manager/ consultant/ supervisor, health care administrator, hospital outreach coordinator, laboratory information system analyst/ consultant, educational consultant/ coordinator/ director, health and safety officer etc.

**YEAR I**

<b>Course Code</b>	<b>Course Title</b>	<b>Theory/ Practical</b>	<b>Continuous Assessment (Internals)</b>	<b>Credits</b>
CSC13107	Fundamentals of Computer Science	70	30	4
PHM13101	Pharmacology	70	30	5
ANT13101	Human Anatomy & Physiology	70	30	5
CRD13101	Clinical Cardiology	70	30	5
ECG13101	Equipments & Machinery	70	30	5
CRD13101P	Clinical Cardiology	35	15	1
ECG13101P	Equipments & Machinery	35	15	1
ECG13102P	E.C.G. Instrumentation & Maintenance- I	35	15	1
TRN13101	Hospital Training-I	200		1
			TOTAL	28

**YEAR II**

<b>Course Code</b>	<b>Course Title</b>	<b>Theory/ Practical</b>	<b>Continuous Assessment (Internals)</b>	<b>Credits</b>
WCM13201	Environmental & Bio Medical Waste Management	70	30	4
ECG13201	Pathology and Terminology	70	30	5
ECG13202	Electrocardiography & Technique	70	30	5
ECG13203	Electricity & Electrocardiogram	70	30	5
HHM13201	General Principles of Hospital Practice and Patient Care	70	30	5
ECG13202P	Electrocardiography & Technique	35	15	1
ECG13203P	Electricity& Electrocardiogram	35	15	1
ECG13204P	E.C.G. Instrumentation & Maintenance -II	35	15	1
TRN13201	Hospital Training-II	200		1
			TOTAL	28

## DETAILED SYLLABUS

**INSTRUCTIONAL METHOD:** Personal contact programmes, Lectures (virtual and in-person), Assignments, Labs and Discussions, Learning projects, Industrial Training Programmes and Dissertation.

### YEAR I

### FUNDAMENTALS OF COMPUTER SCIENCE- CSC13107

UNIT	CONTENTS
1.	<b>Computer Application:</b> Characteristic of computers, Input, output, storage units, CPU, Computers system.
2.	<b>Computers Organization:</b> Central Processing Unit, Control Unit, Arithmetic Unit, Instruction Set, Register, Processor Speed.
3.	<b>Memory:</b> Main Memory, Storage Evaluation Criteria, Memory Organization, Memory Capacity, Random Access Memories, Read Only Memory, Secondary Storage Devices, Magnetic Disk, Floppy and Hard Disk, Optical Disks CD-ROM, Mass Storages Devices.
4.	<b>Input Devices:</b> Keyboard, Mouse, Trackball, Joystick, Scanner, Optical Mark Reader, Bar-code reader, Magnetic ink character reader, Digitizer, Card reader, Voice recognition, Web cam, Video Cameras.
5.	<b>Output Devices:</b> Monitors, Printers, Dot Matrix Printers, Inkjet Printers, Laser Printers, Plotters, Computers Output Micro Files (Com), Multimedia Projector.
6.	<b>Operating System:</b> Microsoft Windows, An overview of different version of windows, Basic windows elements, File managements through windows, Using essential accessories: system tools Disk cleanup Disk defragmenter, Entertainments, Games, Calculator, Imagine-Fax, Notepad, paint, Word Pad, Recycle bin, windows Explorer, Creating folders icons.
7.	<b>Word Processing:</b> Word processing concepts, Saving, closing opening and existing documents, Selecting text, edition text, Finding and replacing text, Printing documents, Creating and printing merged documents, Mail merge, Character and paragraph formatting, page designs and layout, Editing and proofing tools checking and correcting spelling, Handling graphics, Creating tables and charts, Documents templates and wizards.
8.	<b>Presentation Package:</b> Creating opening and saving presentations, Creating the look of your presentation, Working in different views working with slides, Adding and formatting text, Formatting paragraphs, Checking spelling and correcting typing mistakes, Making notes pages and handouts, Drawing and working with objectives, Adding clip art and other pictures, Designing slides shows, Running and controlling a slid show, Printing Presentations.
9.	<b>Internet and Email:</b> Use of Internet and Email, Internet, Websites (Internet Sites), The Mail protocol suite.
10.	<b>Hospital Management System:</b> Types and Uses, Hospital Management & System Package, Advanced Hospital Management System, X O Hospital Management System, LCS Hospital Management Information System, NVISH Hospital Management System, CSPM-Hospital Management System.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Foundations of computing first edition, 2002: P.K. Sinha and P. Sinha.
- B. Microsoft office 2000 for window, second Indian Print, person education S. Sagman

**PHARMACOLOGY- PHM12201**

UNIT	CONTENTS
1.	<b>Cardiac Drugs:</b> 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

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Basic and Clinical Pharmacology by Bertram G Katzung and Susan B Masters, 2012

**HUMAN ANATOMY & PHYSIOLOGY- ANT13101**

UNIT	CONTENTS
1.	<b>The Human Body:</b> Definitions, sub-divisions of Anatomy, Terms of location and position, Fundamental planes, Vertebrate structure of man, Organization of the body cells, Tissues.
2.	<b>The Skeletal System:</b> Types of bones, Structure and growth of bones, Name of all the bones and their parts. Joints classification, Types of movements with examples. <b>Division of the Skeleton-</b> Appendicle Skeleton, Axial Skeleton.

3.	<b>Anatomy of Circulatory System:</b> Heart Size, Position coverings, Chambers, Blood supply, Nerve supply, Blood vessels. General plan of circulation, Pulmonary circulation Names of Arteries and Veins, Their position. Lymphatic System General Plan.
4.	<b>Anatomy of the Respiratory System:</b> Organs of respiratory, Larynx, Trachea, Bronchial Tree, Respiratory portion, Pleurae and Lungs, Brief knowledge of parts and position.
5.	<b>Anatomy of the Digestive System:</b> Components of Digestive system, Alimentary tube, Anatomy of organs of Digestive tube, Mouth, Tongue, Tooth, Salivary glands, Liver, Biliary apparatus, Pancreas, Names and position and brief functions.
6.	<b>Anatomy of the Nervous System:</b> Central nervous system, The Brain, Hind brain, Midbrain, Forebrain, Brief Structure, Locations, and Peripheral nervous system, Spinal cord, Anatomy, Functions, Reflex – Arc, meninges. Injuries to spinal cord and brain.
7.	<b>Anatomy of the Endocrine System:</b> Name of all Endocrine glands, their position. Hormones and their functions– Pituitary, Thyroid, parathyroid, adrenal glands, gonads & islets of pancreas.
8.	<b>Anatomy of Excretory System and Reproductive System:</b> Kidneys location, Gross structure, Excretory ducts, Ureters, Urinary Bladder, Urethra, Male Reproductive system, Testis, Duct system, Female reproductive system, Ovaries Duct system, accessory organs.
9.	<b>Blood:</b> Definitions, Composition, Properties and function of Blood, Haemogram (RBC, WBC, Platelet count, HB concentrations), Function of plasma proteins, Haemopoiesis. <b>Blood Group</b> –ABO and RH grouping, Coagulation & Anticoagulants. <b>Anemia</b> - Anemia causes effects & treatment, Body fluid compartments, composition, Immunity <b>Clotting</b> - Lymphoid tissue, Clotting factors, Mechanism of blood clotting, Disorders of white blood cells, Disorders of platelets, Disorders of clotting.
10.	<b>Cardio Vascular System:</b> Function of cardiovascular system, Structure of cardiovascular system, Cardiac cycle, Functional tissue of heart & their function, Cardiac output, E.C.G., blood pressure, Heart Rate.
11.	<b>Respiratory System:</b> Function of Respiratory System, Functional (physiological), Anatomy of Respiratory system, Mechanism of respiration, Lung volumes & capacities, Transport of respiratory gases.
12.	<b>Digestive System:</b> Function of digestive system, Functional Anatomy of Digestive System, Composition and functions of all digestive juices, Movements of Digestive System (intestine), Digestion & absorption of carbohydrate, proteins & fats.
13.	<b>Functions of Nervous System:</b> Neuron – Conduction of impulses, Factors effecting, Synapse – Transmission, Reception, Reflexes, Ascending tracts, Descending tracts, Functions of various parts of the Brain, Cerebro Spinal Fluid (CSF), Composition, Functions & Circulation, Lumbar Puncture, Autonomic Nervous System – and its types, Functions of (ANS).
14.	<b>Special Senses:</b> Vision – Structure of Eye, function of different parts Refractive errors of and correction. Visual pathways, color vision & tests for color blindness. Hearing, structure and function of ear, mechanism of hearing, test for hearing (deafness).
15.	<b>Muscle Nerve Physiology:</b> Type of muscle, Structure of skeletal muscle, Sarcomere, Neuromuscular junction & transmission, Excitation & contraction coupling (mechanism of contraction).
16.	<b>Structure and Function of Skin:</b> Body temperature, Fever, Regulation of temperature.

17.	<b>Excretory System:</b> Excretory organs, Kidneys, Function, Nephron, Juxta Glomerular Apparatus, Renal Circulation, Mechanism of Urine Formation, Mechanism of Micturition, Cystomatogram, Diuretics, Artificial Kidney.
18.	<b>Structure and Function of Reproductive System:</b> Male reproductive system, Spermatogenesis, Testosterone, Female reproductive system, Ovulation, Menstrual cycleogenesis, Tests for ovulation, Estrogen & progesterone, Pregnancy test, Parturition, Contraceptive, Lactation, Composition of milk, Advantages of breast feeding.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Text books of Physiology. Author : Guyton (Arthor C). Prism publishers Bangalore.
- B. Human Physiology. Author : Chaterjee (cc). Medical allied agency
- C. Concise Medical physiology. Author: Choudhary (Sujit km.). New central books Kolkata.
- D. Review Medical physiology. Author: Ganang. Application and Lange.

## CLINICAL CARDIOLOGY- CRD13101

UNIT	CONTENTS
1.	<b>ECG:</b> Introduction & History of ECG.
2.	<b>Cardiac Electrical Activity:</b> 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.	<b>Recording the Electrocardiogram:</b> Evolution of frontal plane leads, Transverse plane leads, Correct & Incorrect lead placement, Electrocardiography lead placement, Display of 12 standard electrocardiogram leads.
4.	<b>ECG Measurement:</b> 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.	<b>Heart Rate:</b> Introduction, Measuring of heart rates using caliper.
6.	<b>Electrical Axis:</b> Determining electrical axis, Normal axis, RAD, LAD, Methods of electrical axis estimation.
7.	<b>Assessment of Arrhythmias:</b> Supraventricular v/s ventricular rhythms, Rhythmic Disorders.
8.	<b>CAD:</b> 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.	<b>Chamber Enlargement &amp; Hypertrophy:</b> 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.	<b>Clinical Disorder:</b> Miscellaneous, Pericardial effusion, Hyperkalemia, Hypokalemia, Electrode misplacement, Pericarditis, Hypercalcemia, Hypocalcemia.
11.	<b>Reporting:</b> ECG Reporting.

**LEARNING SOURCE:** Self Learning Materials.

**ADDITIONAL READINGS:**

- A. Clinical Cardiology by Melvin D., M.D. Cheitlin, Maurice, M.D. Sokolow-Appleton & Lange; 6 edition (July 1, 1996)
- B. Clinical Methods in Cardiology Soma Raju Orient Blackswan, 2003

### **EQUIPMENTS & MACHINERY- ECG13101**

UNIT	CONTENTS
1.	<b>Surgery and Instruments:</b> 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.	<b>Sterilization and Disinfections in O.T:</b> General Surgical Principles and Instruments, The surgical patient operation room technique <b>Surgical Instruments-</b> Instruments used for preparing Surgical Cheatles forceps, Rampleys sponge, Holding forceps, Mayo's towel clip, Esmarch bandage, Simple tourniquet, Pneumatic tourniquet. <b>Incision making method and Instruments-</b> Bard parker knife handle, Major abdominal incision, Artery forceps and their types, Instruments used in homeostasis, Kocher's forceps and Electrocautery <b>Retractor-</b> Single hook retractor, Czerny's retractor's, Nerve hooks retractor, Morris retractors, Deaver's retractors.
3.	<b>Equipments and Machinery:</b> 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.	<b>Wound Management:</b> 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.

**LEARNING SOURCE:** Self Learning Materials.

**ADDITIONAL READINGS:**

- A. Lab View Based Advanced Instrumentation Systems By S. Sumathi, P. Surekha, Springer
- B. Medical Laboratory Management and Supervision, 2nd ed. By Lionel A. Varnadoe, Jr. Ph.D



## CLINICAL CARDIOLOGY– CRD13101P

UNIT	CONTENTS
1.	<b>ECG Practical:</b> Basic Principles of instruments, Recording the electro cardiogram, Correct & incorrect lead placement, Chest leads, Lims leader, Display of 12 Standard lead ECG, Recognition & interrelation of ECG, Equipment, Usage (Pediatrics/ Adults.
2.	<b>Repair, Maintenance and Monitoring:</b> Indication, Contraindication, Repair and maintenance (operations, calibrations) and servicing, ECG Monitoring in ICCU patient, Recording of halter/ stress ECG, Ambulatory B.P. Monitory, Operation of 2-D ECHO/M. Mode Doppler and CFM system to its maintenance, Operation of TEE And its maintenance, ICCU Monitoring, Practicable in assisting, Temporary- Pace-Make/Permanent pace maker .

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Clinical Methods in Cardiology Soma Raju Orient Blackswan, 2003

## ECG INSTRUMENTATION AND MAINTENANCE-I– ECG13102P

UNIT	CONTENTS
1.	<b>Recording, Monitoring and Maintenance:</b> ECG Recording, pediatric/adults patient, Operations calibrations and servicing of ECG, Recording of Holter/stress ECG,, ECG Monitoring of patient in ICCU, Ambulatory B.P. Monitoring, Operations of 2-D Echo/M.Mode Doppler and CFM system its maintenance, Operations of TEE AND ITS Maintenance, ICCU Monitoring, Other practical in assisting in Temporary Pace Maker/Permanent Pace Maker.
2.	<b>ECG Instruments:</b> Introduction to equipment, Simple usage, Indication & Contraindication use, Repair and Maintenance of equipments, Operation of 2-D Echo/M. Mode Doppler and CFM system its maintenance, Operation of TEE and its maintenance, ICCU Monitoring.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Medical Laboratory Management and Supervision, 2nd ed. By Lionel A. Varnadoe, Jr. Ph.D  
B. Clinical Examination In Cardiology by Rao, Publisher Elsevier India, 2007

## **HOSPITAL TRAINING-I-TRN13101**

YEAR II

**ENVIRONMENTAL & BIO MEDICAL WASTE MANAGEMENT-**  
**WCM13201**

UNIT	CONTENTS
1.	<b>Environment Introduction:</b> Biotic and Abiotic environment, Adverse effects of Environmental Pollution, Control Strategies, Various Acts and Regulation.
2.	<b>Water Pollution:</b> 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.	<b>Air Pollution:</b> 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.	<b>Bio Medical Waste:</b> Bio Medical Waste Management, Introduction to bio medical waste, Types of bio medical waste, Collection of bio medical waste.
5.	<b>Land Pollution:</b> Land Pollution, Soil conservation, Land erosion, Afforestation.
6.	<b>Ecology:</b> 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 <b>Water Harvesting and Rural Sanitation-</b> 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.	<b>Renewable Sources of Energy:</b> Non-Conventional (Renewable) source of energy, Solar Energy, Wind energy, Bio mass energy and Hydrogen energy.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Environmental science-Coming ham Saigo.
- B. Solid waste management-C.L. men tall.

## **PATHOLOGY & TERMINOLOGY- ECG13201**

<b>UNIT</b>	<b>CONTENTS</b>
1	<p><b>Introductory Pathology:</b> Cellular adaptation and cell death, Inflammation and repair, Infection, Circulatory disorders, Immune defense, Genetics of disease, Neoplasia, Cell injury and adaptation, Atrophy, Hypertrophy, Metaplasia, Hyperplasia, Classification of tumors, Premalignant lesion.</p> <p>Types of inflammation &amp; system manifestations of inflammation, Disorders of vascular flow &amp; shock (Brief introduction), Oedema, Hyperemia or Congestion, Thromboses, Embolism, Infarction shock, Ischemia, Over hydration and Dehydration.</p> <p><b>Infection-</b> 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><b>Fundamentals of Medical Terminology:</b> Common Diseases &amp; Procedures, Gastro intestinal, Cholecystitis, Cholelithiasis, Appendicitis, Intestinal Obstruction, Hernia, Peritonitis, Gastroscopy, Endoscopy, Laparotomy, Laparoscopy, Common Diseases &amp; Procedures, Respiratory Tuberculosis, Bronchial Asthma, Respiratory Failure, Pulmonary Embolism, Pneumonia, Bronchoscope, Pulmonary Function test, Cardio-Pulmonary, Resuscitation.</p>
3	<p><b>Cardiology and Pathology:</b> 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><b>Pathology-</b> Urinary Tract Infection, Renal/Bladder Stones, Intravenous Pyelography, Cystoscopy, Urinalysis, Hemodialysis, 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><b>Pathology of the Cardiovascular System:</b> Understand common pathological terms used in the description of heart disease and application, Associated electrocardiographic features, Knowing the meaning of the terms- Atherosclerosis; Atheroma, Ischaemia, Angina pectoris, Unstable angina, Prinzmetal's angina, ST-elevation and non-ST elevation myocardial infarction, Acute coronary syndrome, necrosis, Hypertension, Atrial and Ventricular septal defects, Cyanosis, Coarctation of the aorta, Valvular stenosis and regurgitation, Pericarditis.</p>

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. The language of pathology: an introduction to medical terminology and the nature of disease by Glyndwr Walters
- B. Mini Atlas Pathology: 2007 By Harsh Mohan-Jaypee Brothers

## ELECTROCARDIOGRAPHY & TECHNIQUES- ECG13202

UNIT	CONTENTS
1	<b>Introduction to Electrocardiography:</b> History, psychological basis of E.C.G. conduct, Velocity, Electrophysiology, Central of Wilson augmentation Esophagea, lead Pathway of Activation, Vector Concept.
2	<b>Normal Electrogram:</b> 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	<b>Abnormal Electrocardiogram:</b> Abnormal P-Wave Intraventricular Conduction Defect, RBBB, LBBB, Incomplete LBB, LAHB, LPPHB, Non specific Interventricular Condition, 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	<b>Coronary Artery Diseases:</b> 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	<b>Exercise Test:</b> 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	<b>Disorder of Cardiac Rhythm:</b> 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	<b>Abnormality:</b> ECG as a clue to clinical diagnosis, Pulmonary stenoriss tricuspid tatresia atrial spetal defect, Ventricular spetal defect, Ebstein anomaly, Correct transportation of great vessel mirror image, Dextrocardism, Anomalous origin of left cornaro artery, Rheumatic fever, Mitrial value, Prolapsed athlete's heart, Cardiac pacing act.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Clinical Electrocardiography, Enhanced Edition: A Textbook By Antonio Bay Bayes De Luna- Wiley Publishers
- B. An Introduction to Electrocardiography and Other Cardiac Techniquesby Stephen Graham Leech-American Cardiology Technologists Association

## ELECTRICITY & ELECTROCARDIOGRAM- ECG13203

UNIT	CONTENTS
1.	<p><b>Circuits and Units:</b> Simple electron theory of conduction, Resistance, The Joule, The watt, Properties of electric charge, Capacitor, Electronic potential/potential difference (PD), Type of AC/DC, and Basics of AC Circuits.</p>
2.	<p><b>Electro Magnetism:</b> 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</p>
3.	<p><b>Electrocardiogram:</b> 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, 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.</p>
4.	<p><b>Rhythms arising from the ventricles:</b> 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.</p>
5.	<p><b>ECG Diagnosis:</b> 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.</p>
6.	<p><b>Aims and objective of first aids wounds and bleeding:</b> 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.</p>
7.	<p><b>Infection:</b> Bacteria their nature and appearance, Spread of infections, Auto infection or Cross infection, The inflammatory process, Local tissue reaction, General body reaction, Ulceration aspects and Antisepsis.</p>

**LEARNING SOURCE:** Self Learning Materials.

**ADDITIONAL READINGS:**

- A. Care of patient in diagnostic Radiography Chesney & Chesney
- B. Chesney's Care of the patient in Diagnostic Radiography Pauline J.Culmer.
- C. - Aid to Tray and Trolley Setting Marjorie Houghton

**GENERAL PRINCIPAL OF HOSPITAL PRACTICE AND PATIENT  
CARE- HHM13201**

UNIT	CONTENTS
1	<b>Hospital Procedure:</b> Hospital staffing and organization, Records relating to patients and departmental statistics, Professional attitude of the technologist to patient and other members of the staff, Medico legal aspects, Accident in the department, Appointment, Organization, Minimizing waiting time, Outpatient and follow ups to clinics, Stock taking and Stock keeping.
2	<b>Care of the Patient:</b> First contact with patients in the department, Management of chair and stretcher, Patients and aids for this, Management for the unconscious patient, Elementary hygiene, Personal cleanliness, Hygiene in relation to patient (for example clean linen and receptacles), Nursing care, Temperature, Pulse and Respiration, Essential care of the patient who has a Tracheotomy, Essential care of the patient who has Colostomy, Bedpans and Urinals, Simple application of a Sterile Dressing.
3	<b>Aims and objective of First Aids:</b> Wounds and bleeding, Dressing and bandages, Pressure and splints, Supports etc., Shock insensibility, Asphyxia, Convulsions, Resuscitation. Use of suction apparatus, Drug reactions, Prophylactic measures, Administration of oxygen, Electric shock, Burns, Scalds, Hemorrhage, Pressure points, Compression Band, Fracture, Splints, Bandaging, Dressing, Foreign bodies poisons.
4	<b>Infection:</b> Bacteria their nature and appearance, Spread of infections, Auto infection or Cross infection, The inflammatory process, Local tissue reaction, General body reaction, Ulceration aspects and Antisepsis.
5	<b>Principles of Asepsis:</b> Sterilization, Methods of sterilization, Use of central sterile supply, Departmental care and Identification of Instruments, Surgical dressings in common use including Filament Swabs, Elementary Operating Theatre procedure, Setting of trays and trolleys in the Radiotherapy Department.
6	<b>Departmental Procedures:</b> Department staffing and organization, Records relating to patients and departmental statistic, Professional attitude of the technologist to patient and other members of the staff, Medico legal aspects, Accidents in the department, Appointment, Organization, Minimizing waiting time, Outpatient and follow up, Clinic Stock taking and Stock keeping.
7	<b>Drugs in the Department:</b> Storage, Classification, Labeling and checking, Regulations regarding dangerous and other drugs, Units of measurement, Special drugs, Anti Depressive and Antihypertensive etc.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Deeley-A guide to Radiotherapy nursing Living stone
- B. Care of patient in diagnostic Radiography Chesney & Chesney
- C. Chesney's Care of the patient in Diagnostic Radiography Pauline J.Culmer.
- D. Aid to Tray and Trolley Setting Marjorie Houghton
- E. First Aid-Haugher & Gardner
- F. A guide to Oncology nursing (Livingstone) Deeley

**ELECTROCARDIOGRAPHY & TECHNIQUE- ECG13202P**

UNIT	CONTENTS
1.	<b>ECG Instrumentation:</b> Introduction, Instrumentation, Understanding instrumentation and the basic principles of lead theory needed for the effective and safe practice of Electrocardiography, Understanding the function of the controls of the E.C.G machine, Paper speed, Gain, Filters, Lead selector, Manual/automatic operation, Understanding the care of equipment, Care of recording paper.
2.	<b>Battery Maintenance:</b> Care of leads and cables, Understanding electrodes, Application and connection to electrodes, Care of electrodes, Electrode positions, Understanding lead systems Unipolar and bipolar leads, Einthoven's theory and its application, Wilson's central terminal, Language or communication difficulty, Is infectious or is in isolation.
3.	<b>Recording:</b> Evaluation of the recording to assess the need for re-recording, SCST Certificate of Electrocardiography- Syllabus 2010, Re-recording as appropriate, Recognition and elimination or reduction of artefacts, Labelling of completed recordings as appropriate, Cleaning, Preparation and storage of equipment ready for subsequent recordings including correct Sterilisation and disposal procedures.

**LEARNING SOURCE:** Self Learning Materials.

**ADDITIONAL READINGS:**

- A. Practical Signal and Image Processing in Clinical Cardiology By Jerry J. Goldberger, Jason Ng-Springer
- B. Clinical Cardiac Electrophysiology: Techniques and Interpretations By Mark E. Josephson

**ELECTRICITY & ELECTROCARDIOGRAM - ECG13203P**

UNIT	CONTENTS
1.	<b>Introduction to Equipment:</b> Simple usage, Indication & Contraindication. Use, Repair and Maintenance of equipments, ECG Recording pediatric/adults patient, Operations calibrations and servicing of ECG,

	Recording of Holter/stress ECG.
2.	<b>ECG Monitoring:</b> ECG Monitoring of patient in ICCU, Ambulatory B.P. Monitoring, Operations of 2-D Echo/M.Mode Doppler and CFM system its maintenance, Operations of TEE AND ITS Maintenance, ICCU Monitoring.
3.	<b>Pace Maker:</b> Other practical in assisting in Temporary Pace Maker/Permanent Pace Maker, Operation of 2-D Echo/M. Mode Doppler and CFM system, Maintenance, Operation of TEE and its maintenance, ICCU Monitoring, Other practical in assisting In Temporary Pace Maker/Permanent Pace Maker.

**LEARNING SOURCE:** Self Learning Materials.

**ADDITIONAL READINGS:**

- A. Marriott's Practical Electrocardiography By Galen S. Wagner, 2008 by Lippincott Williams and Wilkins
- B. The Only EKG Book You'll Ever Need By Malcolm S. Thaler, 2008 by Lippincott Williams and Wilkins

**ECG INSTRUMENTATION AND MAINTENANCE-II- ECG13204P**

UNIT	CONTENTS
3.	<b>Recording, Monitoring and Maintenance:</b> ECG Recording Pediatric/Adult patients, Operations calibrations and servicing of ECG, Recording of Holter/stress ECG,, ECG Monitoring of patient in ICCU, Ambulatory B.P. Monitoring, Operations of 2-D Echo/M.Mode Doppler and CFM system its maintenance, Operations of TEE AND ITS Maintenance, ICCU Monitoring, Other practicals in assisting in Temporary Pace Maker/Permanent Pace Maker.
4.	<b>ECG Equipments:</b> Introduction to equipment, Simple usage, Indication & Contraindication use, Repair and Maintenance of equipments, Operation of 2-D Echo/M. Mode Doppler and CFM system its maintenance, Operation of TEE and its maintenance, ICCU Monitoring.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Medical Laboratory Management and Supervision, 2nd ed. By Lionel A. Varnadoe, Jr. Ph.D
- B. Clinical Examination In Cardiology by Rao, Publisher Elsevier India, 2007

**HOSPITAL TRAINING-II-TRN13201**