SYLLABUS OF DIPLOMA IN ECG TECHNOLOGY
First Year

S. No	Subject	Distribution of Marks			
		Th	PR	Viva-voce	Total
Paper I	Communication skills in English	100			100
Paper II	Computer Application	100			100
Paper III	Human Anatomy & Physiology	100			100
Paper IV	Clinical Cardiology	100			100
Paper V	Pathology & Terminology	100			100
Paper VI	ECG instrument & Maintenance		75	25	100
Paper VII	Hospital Training or 45 days (After the final exam)		75	25	100
	Total				**700**

SYLLABUS OF DIPLOMA IN ECG TECHNOLOGY
Second Year

S. No	Subject	Distribution of Marks			
		Th	PR	Viva-voce	Total
Paper I	Pharmacology	100			100
Paper II	Electrocardiography & Techniques	100			100
Paper III	Electricity & Electrocardiogram	100			100
Paper IV	General Principal of Hospital Practice and patient care		200		200
Paper V	Hospital Training for 45 days (After the final exam)		75	25	100
	Total				**600**

SYLLABUS OF DIPLOMA IN ECG TECHNOLOGY

1st Year

S. No.	Course Title	Theory (duration/ hours week)	Practical (duration/ hours week)
1	Communication skills in English	2	2
2	Computer Application	2	2
3	Human Anatomy & Physiology	4	-
4	Clinical Cardiology	4	-
5	Pathology & Terminology	4	-
6	ECG instrument & Maintenance	-	15
7	Hospital Training or 45 days (After the final exam)		

Communication skills in English

Unit	Contents
1	Narration, voice, basic sentence patterns.
2	Transformation of sentences. Determiners, preposition.
3	Tense, Common error, (Noun, Pronoun, Articles, Adverbs, Punctuation, Preposition etc.)
4	Modals in conversation usage, prefix suffix Idioms & Phrasal verbs
5	Composition – I, Unseen passage, precis writing
6	Letter writing, paragraph writing report writing.
7	Easy Writing- Essays on General and load topics related to environmental problems

Practicals:

We envisage two successive stages for attaining skills in communication ability:

1 **Listening:**

For improving listening skills the following steps are recommended.

- Listen to prerecorded tapes
- Reproduce vocally what has been heard
- Reproduce in written from
- Summarize the text heard
- Suggest substitution of words and sentences
- Answer questions related to the taped text
- Summarize in writing

2 **Speaking:**

Introducing English consonant – sounds and vowel- sounds.

3 **Vocabulary:**

- Synonyms Homonyms Antonyms and Homophones

- Words often confused as for example, (I- Me, Your – Yours, its- it's comprehensible- comprehensive, complement- compliment)
- Context – based meanings for the words, for example,
  - (Man (N) Man (vb) step (N), step (vb))
  - (conflict ------- Israel- Palestinian conflict, (Emotional conflict, ldieas confclit)
  - Learn ------- I learn at this school (I Learn from the morning news)

4 Delivering short discourses :

- About oneself
- Describing a place, person, object
- Describing a picture, photo

5 Group discussion:

- Developing skill to initiate a discussion (how to open)
- Snatching initiative from others (watch for weak points etc.)

6 Expand a topic- sentence into 4-5 sentence narrative:

Computer applications:

Fundamentals of Computer Science

Unit	Contents
1	Computer Application- Characteristics of computer, input, output, storage units. CPU Computers system.
2	Computer organization – Central Processing unit, Control unit, Arithmetic unit, Instruction set, register, Processor speed
3	Memory – 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	Input devices- Key Board, Mouse trackball, Joystick, scanner, optical mark reader, barcode reader, magnetic ink character reader, digitizer, Card reader, voice recognition, Web cam, Video Cameras.
5	Output- monitors, printers, dot matrix printers, inkjet printers, inkjet printers, laser printers, plotters and computers out micro files (Com), Multimedia Projector,.
6	Operative System – 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, Entertainment Games, Calculator, Imagine-Fax, Notepad, Paint, Word Pad, Recycle bin, windows Explorer, Creating folders icons.
7	Word processing – 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	`Presentation package- creating opening and saving presentation, 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 picture, Designing slides shows, Running and controlling a slide show, Printing Presentations.
9	Use of internet and Email, Internet, Websites (Internet sites), The Mail protocol suite.
10	Hospital Management – 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.

Human Anatomy & Physiology

Unit	Contents
1	The Human Body- Definitions, Sub-divisions of Anatomy, Terms of location and position, Fundamental planes, vertebrate structure of man, organization of the body cells, Tissues.
2	The Skeletal System – Types of bones, structure and growth of bones, Division of the skeleton Appendicle skeleton, axial skeleton name of all the bones and their parts, Joints classification, types of movements with examples.
3	Anatomy of Circulatory System- Hearts Size, position coverings, Chambers, Blood supply, never supply, the blood vessels, general plan of circulation, pulmonary circulation, names of arteries and veins and their position – lymphatic system general plan.
4	Anatomy of the Respiratory System – organs of respiratory, larynx, trachea, bronchial tree, Respiratory portion, pleurae and lungs, Brief Knowledge of parts and position.
5	Anatomy of the Digestive system- Components of Digestive system, Alimentary tube, anatomy of organs of digestive tube, mouth, tongue, tooth, salivary glands, liver, bleary apparatus, pancreas. Names and position and brief functions.
6	Anatomy of the Nervous System – Central nervous system, the brain, hind brain, midbrain, forebrain, brief structure, locations, and peripheral nervous system, spiral card, anatomy, functions, reflex – Arc, ménage, injuries to spinal card and brain.
7	Anatomy of the endocrine system – name of all endocrine glands their position, hormones, and their functions – pituitary, thyroid, parathyroid, adrenal glands, gonads & islets of pancreas.
8	Anatomy of Excretory System and reproductive system – Kidneys location, gross structure, excretory ducts, urethras, urinary bladder, urethra male reproductive system, Testis, duct system, Females reproductive system, ovaries Duct System, accessory organs,
9	Blood – Definition, composition, properties and function of blood, haemogram (RBC, WBC, Platelet count, HB concentrations), function of plasma proteins haemopoiesis, blood Group – ABO and RH grouping, coagulation & Anticoagulants, Anemia causes effects & treatment, Body fluid compartments, composition, Immunity Lymphoid tissue, clotting factors, mechanism of blood clotting, Disorders of white blood cells, Disorders of platelets, Disorders of clotting.
10	Cardio vascular system – 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	Respiratory system – Function of respiratory system, functional (physiological), Anatomy of Respiratory system, mechanism of respiration, lung volumes & capacities, transport of respiratory gases.
12	Digestive system – function of digestive system, functional anatomy of digestive system, composition and function of all digestive juices, movements of digestive system (intestine), Digestion & absorption of carbohydrate, proteins & fats.
13	Function of nervous system – neuron – conduction of impulses, factors effecting, synapse transmission, reception, reflexes, ascending tracts, descending tracts, function of various parts of the Brain, cerebro spinal fluid (CSF), composition, function & circulation, lumbar puncture, Autonomic nervous system-and its types function of (ANS)
14	Special Senses – 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	Muscle Nerve Physiology – Type of muscle, structure of skeletal muscle, sarcomee, neuromuscular junction & transmission, excitation & contraction coupling (mechanism of contraction)
16	Structure and function of skin – body temperature, fever regulation of temperature.
17	Excretory system – excretory organs, kidneys, function, nephorn, juxta glomerclar apparatus, renal circulation, mechanism of urine formation, mechanism of maturation, cystomatrogram, diuretics, artificial kidney.
18	Structure and function of reproductive – Male reproductive system, spermatogenesis, testosterone, female reproductive system, ovulation, menstrual cycle, cogenesis, test for ovulation, estrogen & progesterone, pregnancy test, parturition, contraceptive, lactation, Composition of milk, advantages of breast feeding.

Clinical Cardiology

Unit	Contents
1	Introduction & History of ECG.
2	Cardiac Electrical Activity – ECG (Electrocardiogram), Anatomy 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.
4	In perpetration of normal ECG, Electro- cardio- graphic features, Rate & regularity, P wave, PR interval, QRS complex, ST segment, T wave, U wave, QTC interval, Cardiac rhythm.
5	Interval measurement, horizontal measurement, vertical measurement, ECG wave's interval & segments.
6	Heart Rate – Introduction, Measuring of heart rates using caliper.
7	Electrical Axis – Determining electrical axis, normal axis, RAD, LAD, Methods of electrical axis estimation.

8	Assessment of arrthymias, Supraventricular v/s ventricular rhythms, Rhythmic Disorders.
9	CAD (Coronary Artery Deases), effects of MI injury & infraction on ECG, manifestation of Q wave infarction, manifestation of non-Q wve infarction, anteriord infarction, Antero-Lateral infarction, inferior infarction.
10	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 Biventricular hypertrophy.

Clinical Cardiology – (Practical)

Unit	Contents
1	Basic Principals of instruments, Recording the electro cardiogram, Correct & incorrect lead placement, chest leads, Lims leads, Display of 12 standard lead ECG, Recognition & interrelation of ECG, Equipment, usage (Pediatrics/Adults.)
2	Indication, Contraindication, Repair & maintrnatcle, (operations, calibrations) and servicing, ECG Monitoring in ICCU patient, Recording of holter/stress ECG, Ambulatory BP. 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-maker/ permanent pace maker, coronary Angiography, Coronary Angio Plasty, Balloon Plasty, CRT, CRTD etc.

Pathology & Terminology

Unit	Contents
1	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, Type of inflammation & system manifestations of inflammation, Disorders of vascular flow & shock (Brief introduction), Oedema, hyperemia or congestion, thromboses, embolism, infarction shock, ischemia, Over hydration, Dehydration, 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.
2	Fundamentals of Medical Terminology – Common Disease & Procedures, Castro intestinal, Chelecystitis, Cholelithiasis, Appendicitis, Intestinal Obstruction, Hernia, Peritonitis, Gastro copy, Endoscopy, Laparotomy, laparoscopy, Common Disease & Procedures, Respiratory Tuberculosis, Bronchial Asthma, Respiratory Failure, Pulmonary Emboli Son, Pneumonia, Bronchoscope, Pulmonary Function test, Cardio- Pulmonary, Resuscitation.
3	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, Urinary Tract Infection Renal/Bladder Stones, Intravenous Pylography, Cystoscopy, Urinalysis, Hoemodialis, Peritoneal Dialysis, Nervous, Stroke (Cerebro Vascular Accident), Brain Tumor, Brain Injuries, Spinalr Cord Injuries, LUmbar Puncture, Myelography, CT Scan. MRI, EEG, EMG Oncology, Investigations, tumor markers, RECIST Criteria for response evolution.
4	Pathology of the Cardiovascular System – Understands common pathological terms used in the description of heart disease and where applicable, associated

	electrocardiographic features, Knows the meaning of the terms, Atherosclerosis, atheroma, Ischaemia, Angina pectoris, Unstable angina, Prinzmetals angina, ST-elevation and non-ST elevation myocardial infraction, Acute coronary syndrome, necrosis, hypertension, Atrial and Ventricular septal defects, Cyanosis, Coarctations of the aorta, Valvular stenosis and regurgitation, Pericarditis.

ECG Instrument and Maintenance (Practical)

Unit	Contents
1	ECG Recording, pediatric/adults patient, Operations calibrations and servicing of ECG, Recording of Holter/stress ECG Monitoring 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 Pacemaker/Permanent pace maker.
2	Introduction to equipment, Simple usage, Indication & Contraindication use, Repair and Maintenance of equipments, Operations of 2-D Echo/M.Mode doppler and CFM system its maintenance, ICCU Monitoring.

Hospital Training for 45 days after the final examination

IInd Year

S.No.	Course Title	Theory (duration/ hours week)	Practical (duration/ hours week)
1	Pharmacology	4	-
2	Electrocardiography & Techniques	2	15
3	Electricity & Electrocardiogram	-	15
4	General Principal of Hospital Practice and patient care	-	5
5	Hospital Training for 45 days (After the final exam)		

Pharmacology:

A knowledge of concern disease and drugs where after the structure and funciton of the heart is essential for instrument technician.

- Cardiac Drugs
- Effect of drugs and ECG Changes
- Toxicity of Drugs and ECG Changes.

Electrocardiography & Techniques:

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 Electro gram – Atrial Complexes, P-R interval, QRS Complex S.T. Segment T- Wavw 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 Defct, 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 (RBH), Pulmonary embolism, Chronic Obstructive lung Disease (COLD), Biventricular Hypertrophy, Overload Concept, Diastolic Overload.
4	Coronary artery disease – Ischemia Injury infracting subtle atypical non specific Pattern conduction defects and infraction localization of infraction wpm and acute myocardial infarction atrial infraction, VCG in myocardial, infraction atrial infraction, VCG in myocardial, infraction 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 extraystoles Blocked atrial premature beats cause of Atrial Tachyeardia (PAT) Chaotic Atrial Rhythm, Atrial flutter atrial fibrillation Supraventricular tachycardia (SVT) ventricular rhythm ventricular tachy cardia (VT) Ventricular fibrillation proarrhythmia; parasystole, group beatig; AV – Disoocation torsade de points sick sinus syndrome.
7	ECG as a clue to clinical diagnosis, Pulmonary stenoriss tricuspid tatresia atrial spetal defect ventricular sptal defect ebstein anomaly correct trtransporation of great vassel mirro image dextrocards;m anomalous brigin of left cornaro artery Rheumatic fever mitrial value prolapsed athetetes cardiac pacing act.

Electricity & Electrocardiogram

Unit	Contents
1	Simple electron theory of conductions, Resistane, The Joule the watt, Properties of electric charge, Capacitor, Electronic potential/ potential difference (PD), Type of AC/DC, Basic of AC Circuits.
2	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.
3	The appearance of the normal resting electrocardiogram, Recognizes the normal variations of the electrocardiogram in relation to age, State of activity, body build, ethnic, origin, Recognizes 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: (Wenkebach), Mobitz II and 2:1 block, 3rd degree (complete) AV block.
4	Rhythms arising from the ventricles, Ventricular escape beats, Ventricular premature beats (estopics) 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	This section will comprise of three 12 – lead ECG.s taken from the following list – 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 bandage pressure and splints supports etc, shock insensibility, asphyxia convulsions resuscitation, use of suction, apparatus, drug reaction, prophylactic, measure administration of oxygen, electric shock burns, scalds, hemorrhage, pressure points, compression band, Fracture splints, Bandaging, dressing, foreign bodies poisons.
7	Infection – Bacteria their nature and appearance, spread of infections, spread of infections, auto infection or cross infection, the inflammatory process, local tissue reaction, general body reaction, ulceration aspects and antisepsis.
8	Department procedures, 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 accident in the department appointment organization minimizing waiting time out patient and follow up clinic stock taking and stock keeping.
9	Drugs in the department – Storage classification labeling and checking regulations regarding dangerous and other drugs units of measurement special drugs and depressive antihypertensive.

General Principal of Hospital Practice and patient care

Unit	Contents
1	Hospital Procedure – Hospital staffing and organization, records relating to patients departmental, statistic 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 up clinics, stock taking and stock keeping.
2	Care of patient – First contact with patients in the department management of chair and stretcher patients and aids for this management for the unconscious patients elementary hygiene personal cleanliness hygiene in relation to patient (for example clean linen and receptacles nursing care temperature pulse and respiration essential care of thee patient who has a tracheotomy essential care of the patient who has a colostomy bedpans and urinals simple application of a sterile dressing.
3	Aims and objective of firs aids – wounds and bleeding dressing and bandages pressure and splints supports etc. Shock insensibility asphyxia convulsions resuscitation use of suction apparatus drug reaction prophylactic measure administration of oxygen electric shock burns scalds hemorrhage pressure points

	compression band Fracture splints bandaging dressing foreign bodies poisons.
4	Infection – 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	Principles of asepsis Sterilization methods of sterilization use of central sterile supply department care of 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	Departmental procedures – 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 accident in the department appointment organization minimizing waiting time out patient and follow up clinic stock taking and stock keeping.
7	Drugs in the department – Storage classification labeling and checking regulations regarding dangerous and other drugs units of measurement special drugs ant depressive antihypertensive etc.

Electricity, Cardiography & Technique (Practical)

Unit	Contents
1	Introduction, Instrumentation, Understands instrumentation and the basic principles of lead theory needed for the effective and safe practice of electrocardiography, understands the function of the controls of the E.C.G. machine, Paper speed, Gain Filters, Lead selector, Manual/automatic operation, understands care of the equipment, Care of recording paper.
2	Battery maintenance, Care of leads and cables, understands electrodes. Application and connection to Electrode positions. Understands lead system Unipolar and bipolar leads, Einthoven's theory and its application, Wilson's central terminal, Has language or communication difficulty, is infectious or is in isolation.
3	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 artifacts, Labeling of completed recordings as appropriate, cleaning, preparation and storage of equipment ready for subsequent, Recordings, including correct sterilization and disposal procedures.

Electricity, Electrocardiogram (Practical)

Unit	Contents
1	Introduction to equipment, 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	ECG Monitoring of patient in ICCU, Ambularoty B.P. Monitoring, Operation of 2-D Echo/M.Mode doppler and CFM system its maintenance, operation of TEE and its Maintenance, ICCU Monitoring.
3	Other practical in assisting in Temporary Pacemaker/Permanent Pacemaker, Operation of 2-D Echo/M.Mode Doppler and CFM system its maintenance, operation of TEE and its maintenance, ICCU Monitoring, Other Practical in assisting in Temporary pacemaker/Permanent Pacemaker.

Hospital Training for 45 days after the final examination