



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்
MANONMANIAM SUNDARANAR UNIVERSITY

SYLLABUS FOR DIPLOMA IN CARDIAC TECHNICIAN PROGRAMME
OFFERED THROUGH DIRECTORATE OF VOCATIONAL
EDUCATION (COMMUNITY COLLEGES AND VOCATIONAL SKILL
DEVELOPMENT CENTRES) FROM 2024– 2025



Programme Code: 5281

DIPLOMA IN CARDIAC TECHNICIAN -5281

இதய தொழில்நுட்பவியலாளர் பட்டயம்

SCHEME OF EXAMINATION

Course Code	Title of The Course	Credit	Hours	Passing Minimum
Semester I				
C24CT11/E24CT01	Anatomy, Physiology & Microbiology	6	90	40/100
C24CT12/E24CT02	Cardio Respiratory Diseases	6	90	40/100
C24CT13/E24CT03	Basics& Advanced Electrocardiography	6	90	40/100
C19CE10/E19CE10	Communicative English	6	90	40/100
C24CTP1/E24CTP1	Practical I – ECG Techniques	4	90	40/100
Semester II				
C24CT21/E24CT04	Echocardiography	6	90	40/100
C24CT22/E24CT05	First Aid & CPR, Biomedical Waste Management	6	90	40/100
C19LS23/ E19LS05	Life Skill	6	90	40/100
C24CTP2/E24CTP2	Practical II –ECHO Techniques	4	60	40/100
C24CTIP/ E24CTIP	Internship	10	150	40/100

Eligibility for admission: Pass in 10th std examination Conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

Examination: Passing Minimum for each Course is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the Courses and as given below:

- 40% but less than 50% - Third class
- 50% but less than 60% - Second class
- 60% and above - First class

Theory Paper

Internal Marks-25

External Marks-75

SYLLABUS

Semester I

CourseI	:	Anatomy, Physiology & Microbiology
CourseII	:	Cardio Respiratory Diseases
CourseIII	:	Basics & Advanced Electrocardiography
CourseIV	:	CommunicativeEnglish
CourseV	:	Practical I- ECG Techniques

SemesterII

CourseVI	:	Echocardiography
CourseVII	:	First Aid & CPR, Biomedical Waste Management
CourseVIII	:	Life Skills
CourseIX	:	PracticalII- ECHO Techniques
CourseX	:	Internship

***(Semester Pattern for Community College Only)**

SEMESTER I

COURSE I

(C24CT11/ E24CT01) **Anatomy, Physiology & Microbiology**

OBJECTIVES

It is the study of structure of human body in all its totality. Understanding the organs, their structures & correlating it with their physiology leads to a truly holistic approach which can help the clinicians to understand the intricacies of disease, their presentations and mode of treatment.

UNIT I

18 Hrs

Introduction to the human body: Cell -Tissues- Organs -System Anatomical Terms - Anterior, Posterior, Superior, Inferior, Lateral, **Regions** - Head, Neck, Thorax, Abdomen, Pelvis. **Body Movements** - Flexion, Extension, Abduction, Adduction, Supination, Pronation, Abbreviations. **Blood** - Introduction, Red blood cells, White blood cells & Platelets and its functions- Blood coagulation - Clotting factors.

UNIT –II

18 Hrs

Cardiovascular system - Introduction - Structure and functions - Chambers Valves, Pericardium- Myocardium- Endocardium, - Conducting system of heart – Peripheral vascular system – Major arteries and veins. Blood circulation -Types.

Respiratory system - Introduction - Structure-Nose -Pharynx- Larynx -Trachea-Bronchi - Alveoli - Lungs, Functions - Regulation of Respiration- Lung Volume Capacities - Abnormalities of Respiration.

UNIT-III

18 Hrs

Digestive system - Introduction - Structure and functions of digestive organs - Pharynx - Oesophagus- Stomach- Small Intestine, Large - Intestine - **Accessory organs** - Salivary glands - Pancreas - Liver& Gall bladder structure and functions.

Urinary system - Introduction - Structure and functions - Cross section of Kidney – Nephron - Renal tubules - Abnormalities of urination.

Skeletal system - Introduction - Classification of bones Structure and Functions of bones - Total Number of bones.

UNIT-IV

18 Hrs

Nervous system - Introduction - Brain - Neuron - Parts of brain structure and functions - Spinal cord - Structure and functions. Cerebro spinal fluid - functions Cranial nerves & Spinal nerves - Functions.

Endocrine system - Introduction - Pituitary gland, Thyroid gland Parathyroid gland, Adrenal glands, Pancreas, Thymus gland, Ovaries - Testes. -Special Senses - Eye - Ear - Nose - Tongue - Skin, Structure and functions

UNIT-V

18 Hrs

Microbiology - Introduction - Brief historical review of bacteriology basic structure of microorganism. Bacteria - Common bacteria - **Viruses** - Measles - Chicken pox- Polio- Hepatitis - Acquired Immuno deficiency virus - **Immunity** - definition – types

Reference:

1. Susan Standring, Gray's Anatomy, The Anatomical Basis of Clinical Practice, 42nd International edition.
2. Ross and Wilson Annie Waugh, Allison Grant - 2022, Anatomy & Physiology in Health and Illness, 14th Edition, Oswaal Publisher, Haryana, India.
3. Dr.S.Senthilkumar, 2022, Anatomy & Physiology, 3rd Edition, Shanlax Publications Madurai, Tamilnadu.
4. A.K. Jain, 2020, Anatomy & Physiology, 4th Edition, Arya Publications, New Delhi.

COURSE –II

(C24CT12 /E24CT02)CARDIO RESPIRATORY DISEASES

OBJECTIVES

To learn about Cardio respiratory diseases, to Learn about Diabetes Mellitus, Hypertension, Myocardial Infarction, Ischemic heart diseases, Coronary heart disease and to learn the Respiratory diseases.

UNIT-I

18 Hrs

Diabetes Mellitus - Introduction - Causes - Types - Signs and symptoms Treatment - Complications.

Hypertension and Hypotension - Introduction - Causes - Types - Signs and symptoms - Treatment - complications, Prevention.

UNIT-II

18 Hrs

Ischemic heart diseases, Coronary artery disease - Introduction - Causes Clinical Features - Treatment - Complications Prevention. Myocardial Infarction - Introduction - Causes - Clinical Features, Treatment - Complications, Prevention.

UNIT-III

18 Hrs

Valvular heart diseases - Heart Failure – Pericardial diseases – Electrical disturbances of the heart – Pulmonary hypertension – Peripheral vascular diseases – Congenital heart diseases

UNIT-IV

18 Hrs

Respiratory diseases - Upper respiratory tract Infection - Pharyngitis - Causes and Signs and symptoms, Treatment, Laryngitis - Causes signs and symptoms, Treatment - Tonsillitis - causes, signs and symptoms treatment.

UNIT-V

18 Hrs

Lower respiratory tract Infection - Pulmonary tuberculosis - Causes Signs and symptoms - Treatment - Pneumonia Causes, Signs and symptoms, Treatment - Lung abscess, Acute Respiratory Distress Syndrome - Asthma - Chronic Obstructive Pulmonary Disease. Causes, Signs and symptoms, Treatment - Bronchitis - Bronchiectasis – Atelectasis Causes, signs and symptoms, Treatment.

Reference books:

1. BS.Cheema, Clinical Cardiology and Electrocardiography, 4th October 2023, CBS Publishers & Distributors
2. Ramesh R Rau, Clinical Cardiology Made Easy, 2015, Jaypee Brothers Medical Publishers Ltd.
3. AdithyaUdupa K Essentials of Clinical Cardiology, 2017, 1st edition, Paras Medical Books
4. Achyut Sarkar Clinical Cardiology: A Disease Specific Approach, Jaypee Publications

COURSE –III
(C24CT13/ E24CT03) BASICS & ADVANCED ELECTROCARDIOGRAPHY

OBJECTIVES

To learn the Basics of ECG and its Principles, Describe advance ECG techniques, including Arrhythmia Analysis, Ischemia detection, QT interval analysis, ST segment analysis and other interpretation of cardiac anomalies

UNIT-I

18 Hrs

Basics ECG Concepts - Electro physiology – Einthoven's Law – The Hexaxial system
Fundamental Principles of electrocardiography

ECG Waves - The 12 Lead system – – Normal Electrocardiogram - The normal P wave-
Atrial activation-Atrial repolarization-Atrioventricular nerve conduction

UNIT-II

18 Hrs

ECG Machines- Operation and maintenance of ECG machines – Identification of basic defects and repair – Safety standards of ECG machines

UNIT III

18 Hrs

Advanced Electrocardiography - Abnormalities of Electrocardiogram – Left atrial abnormality – Right atrial abnormality - Left ventricular hypertrophy and enlargement – Right ventricular hypertrophy and enlargement

UNIT IV

18 Hrs

Disease Conditions – Recognition of Myocardial Infarction – Basic arrhythmias and Conduction Disturbances – Fascicular block – Bundle branch block – QRS Changes – Cardiac arrhythmias

UNIT V

18 Hrs

Treadmill –Stress ECG recording – Ambulatory ECG Recording/Holter monitoring – Ambulatory BP

Reference books:

1. Prof.Dr.M.Chenniappan, Dr. G.Dominic Rodriguez, Members of ECG an Echo Club, 2019, ECG ignited Book, Standard Edition, Trichy.
2. AtulLuthra, 2012, ECG Made easy, 4th Edition, Jaypee brothers medical publishers, NewDelhi,
3. Catherine M Otto,Textbookof Clinical Echocardiography,2018, 6th edition, Elsevier Publications.
4. Helen Rimington, John B Chambers, Echocardiography – A practical guide for reporting and interpretation, Third edition, 2015, CRC Press Taylor & Francis group

COURSE IV
(E19CE10/C19CE10) COMMUNICATIVE ENGLISH

OBJECTIVES

90HRS

To expose students to the fundamentals of academic and professional communication in order to develop professionals who can effectively apply communication Skills, theories and best practices to meet their academic, professional and career communication need

1. Basic Grammar:

- a. Review of grammar
- b. Remedial study of grammar
- c. Simple sentence
- d. Word passive voice etc.

2. Bubbling Vocabulary:

- a. Synonyms
- b. Antonyms
- c. One – work Institution

3. Reading and Understanding English

- a. Comprehension passage
- b. Précis – writing
- c. Developing a story from hints.

4. Writing English

- a. Writing Business letters.
- b. Paragraph writing
- c. Essay writing
- d. Dialogue writing
- e.

5. Speaking English

- a. Expressions used under different circumstances
- b. Phonetics

Reference

1. V.H.Baskaran – —English Made Easy||
2. V.H.Baskaran – —English Composition Made Easy|| (Shakespeare Institute of English Studies, Chennai)
3. N.Krishnaswamy – —Teaching English Grammar|| (T.R.Publication, Chennai)
4. —Life Skill|| – P.Ravi, S.Prabakar and T.TamzilChelvam, M.S.University, Tirunelveli.

COURSE V
(C24CTP1 / E24CTP1) PRACTICAL – I ECG Techniques

OBJECTIVES

90 HRS

Hands-on training in using and maintaining ECG machines, Practical experience in a clinical setting where students apply their knowledge under supervision, gaining real-world skills.

ECG Techniques – Steps & procedure of ECG, Understanding Rhythm, Rates and Waves, ECG recording in Adult & Pediatric patients – Operation, Calibration and Servicing of ECG Machines, Stress ECG Recording – Holter Recording

SEMESTER II

COURSE VI (C24CT21 / E24CT01) ECHOCARDIOGRAPHY

OBJECTIVES

To learn the Echocardiogram and its principles, Demonstrate Echocardiography techniques, including Doppler echocardiography, Echocardiography in Valvular heart disease and Cardiomyopathies to analyze echocardiographic examinations to assess cardiac structure and function.

UNIT I

18 HRS

ECHO - Basics of Echocardiogram - Principles of Echocardiogram - Indications - Treadmill Test - Pulmonary function test – Responsibilities of Technician

UNIT II

18 HRS

Doppler echocardiography – pulsed – continuous wave – colour measurement of cardiac dimensions - Stress Echo Cardiography and Contrast Echo Cardiography

UNIT III

18 HRS

Echocardiography in Valvular heart diseases – Mitral stenosis – Mitral regurgitation – Mitral valve prolapse – Aortic stenosis – Aortic regurgitation – Infective endocarditis

UNIT IV

18 HRS

Echocardiography in Cardiomyopathies – Dilated Hypertrophic Restrictive Constrictive pericarditis – Pericardial effusion and cardiac tamponade

UNIT V

18 HRS

Echocardiographic detection of congenital heart disease – Atrial septal defect – Ventricular septal defect – Patent ductus arteriosus – Pulmonary stenosis – Tetralogy of Fallot – Coarctation of aorta left

Reference:

1. Atul Luthra, 2012, Echo made easy 3rd Edition, Jaypee brothers medical publishers, New Delhi.

COURSE VII
(C24CT22 / E24CT04) FIRST AID, CPR, BIOMEDICAL WASTE MANAGEMENT

OBJECTIVES

To learn about first aid, principles, Goals, First aid kit, to know about the first aid for Medical & Respiratory emergencies, to learn Basic cardiac life support and Advance cardiac life support and to know the Biomedical waste management and infection control.

UNIT I

18 HRS

First Aid - Definition - Objectives of first aid - Principles of First aid Qualifications of first aid - Goals of first aid - First aid tools and its uses Golden rules of First aid -Responsibilities of First aid Provider

UNIT II

18 HRS

Medical emergencies- Myocardial Infarction- Hyperglycemia - Hypoglycemia -Stroke - Poison - Fractures - Seizures - Convulsions - Burns. Shock & Snake bite - Definition - Types - Causes - Signs and symptoms - Management - Medico Legal cases.

UNIT III

18 HRS

Respiratory emergencies - Asphyxia - Causes, Signs and symptoms, Management, Prevention. **Drowning** - Causes, Signs and symptoms, Management, **Choking** - Causes, Signs and Symptoms, Management Prevention - **Asthma** - Causes, Signs and symptoms, Treatment, Chronic Obstructive Pulmonary Disease - Causes, Clinical features, Management

UNIT IV

18 HRS

Basic Life support, Introduction, Goal of CPR, -Concept Chain of survival, Purposes of Cardiopulmonary Resuscitation Algorithm of CPR Adult and Children Steps of CPR - Techniques- Qualities of CPR, Complications of CPR - Advanced Cardiac Life Support - Automated External Defibrillation.

UNIT V

18 HRS

Biomedical Waste Management: Introduction, Definition, Sources, Properties, Routes of disease transmission. Safety measures – Protective devices, Measures. Provision of the law. Biomedical and chemical wastes - Types handling – control of biomedical wastes - Disposal methods. Treatment and disposal techniques – Physical, chemical and biological processes – Health and environmental effects.

COURSE VIII
(C19LS23/E19LS05) LIFE SKILL

OBJECTIVES

90 HRS

To educate about Life skills includes on Life Coping or adjustment, Attitude, Problem solving and basic computer Knowledge with internets

I Life Coping or adjustment

- (a) External and internal influence in one's life
- (b) Process of coping or adjustment
- (c) Coping with physical change and sexuality
- (d) Coping with stress, shyness, fear, anger far live and criticism.

II Attitude

- (a) Attitude
- (b) Self-acceptance, self – esteem and self-actualization
- (c) Positive Thinking

III Problem Solving

- (a) Goal Setting
- (b) Decision Making
- (c) Time Management and stress Management;

IV Computers

- (a) Introduction to Computers
- (b) M.S Office
- (c) Power Point

V Internet

- (a) Introduction to internet
- (b) E – Mail
- (c) Browsing

Reference:

- 1) Life Skill Programme course I & II by Dr.XavierAlphona MCRDE Publications.
R.K.Mutta Road, Chennai -2
- 2) Life Skill P.Ravi, S.Prabahar&T.TamilChelvam, M.S.University, Tirunelveli

COURSE IX
(C24CTP2/E19CTP2)
PRACTICAL II –ECHO TECHNIQUES

OBJECTIVES

60 HRS

Hands-on training in using and maintaining ECHO machines, Practical experience in a clinical setting where students apply their knowledge under supervision, gaining real-world skills.

Echocardiogram Techniques – M mode & 2D transthoracic echocardiography – Stress Echo Cardiograph – Contrast Echo Cardiograph – Echocardiography in valvular heart disease

Out comes:

- Learnt about to take Electrocardiogram and abnormalities
- Learnt about Echocardiogram and abnormalities.

Reference:

1. LC Gupta, Abhitabh Gupta, 2012, Manual of First aid, 1st Edition, Jaypeebrothers medical publishers, India.
2. KPP. Abhilash, 2022, Handbook of Emergency medicine, 3rd Edition, Jaypeebrothers medical publishers. India.
3. SN Chugh, AhimaChugh, 2019, Emergency medicine,5th Edition, CBS publishers distributors, New Delhi.

**COURSE X
(C24CTIP/E24CTIP) INTERNSHIP**

OBJECTIVES OF INTERNSHIP

150 HRS

- Demonstrate the application and functioning of medical electronic devices in diagnosing, monitoring and treating cardiovascular diseases
- Conduct and interpret a basic Electrocardiogram (ECG) and record common cardiac abnormalities
- Describe advance ECG techniques, including Arrhythmia analysis, ischemia detection, QT interval analysis, ST segment analysis and other interpretation of cardiac anomalies.
- Demonstrate Echocardiography techniques, including Doppler echocardiography, Echocardiography in Valvular heart diseases and Cardiomyopathies, to analyze echocardiographic examinations to assess cardiac structure and function
