B.Sc., CARDIAC TECHNOLOGY DEGREE COURSE FROM THE ACADEMIC YEAR - 2020-2021

SYLLABUS

PAPER – I BASIC ANATOMY

THEORY

Introduction to Anatomy Basic Anatomical terminology

Osteology- Upper limb – clavicle, scapula, humerous, radius, ulna Lower limb - femur, hipbone, sacrum, tibia, fibula Vertebral column

Thorax – Intercostal space, pleura, bony thoracic cage, ribs sternum & thoracic vertebrae

Lungs – Trachae, bronchial tree and circulation.

Heart – Surface and gross anatomy of heart, chambers of the heart, valves of the heart, major blood Vessels of heart, pericardium, coronary arteries, pulmonary circulation and venous system.

Myology – Muscles of thorax, muscles of upper limb (arm & fore arm)

Flexor and extensor group of muscles (origin, insertion, nerve supply, action)

Histology – Types of tissue

a. Epithelia - Squamous
   Glandular
   Transitional
   Cartilage
b. Connective tissue – bone, fibrous tissue, muscle

Excretory system – Kidney, ureters, bladder, structure of nephrons.

PRACTICALS

Heart cut section, Anatomy of Heart and Identification of structures

Histology – Slides for identification, general features, heart muscle valve and atherosclerosis

PHYSIOLOGY

1. Overview of the cardiovascular system
   Functions of the cardiovascular system Circulation of blood
   Central control of the cardiovascular system

2. Cardiac cycle
   Mechanical events
   Arterial cycle and central venous pressure cycle
   Clinical aspects of human cardiac cycle

3. Cardiac excitation and contraction
   Mechanism of contraction
   Sinoatrial node function
   The cardiac conduction system
   Atrioventricular node function
   Autonomic regulation of the heart rate

4. Assessment of cardiac output
   Fick principle
   Thermodilution and indicator dilution methods
   Pulse Doppler methods
   Miscellaneous methods

5. Hemodynamics
   Relationship between pressure, flow and
   resistance Frank-Starling law
   Preload, afterload and contractility Control of stroke volume and cardiac output

6. Solute transport between blood and tissues
   Circulation of fluid between plasma, interstitium lymph

7. Vascular smooth muscle
   Mechanism of contraction
   Pharmacomechanical coupling, automaticity

8. Control of blood vessels
   Local control mechanisms
   Nervous control
   Hormonal control

9. Specialization in individual circulation
   Coronary circulation
   Cerebral circulation
   Pulmonary circulation
   Cutaneouos circulation

10. Cardiovascular receptors, reflexes and central control

11. Coordicated cardiovascular responses
   Posture
   Valsalva manoeuvre
   Exercise
   Divingreflex

12. Cardiovascular responses ion pathological
   Situations Shock and haemorrhage
   Syncope Essential
   Hypertension
   Chronic cardiac failure

13. Respiratory physiology
   Mechanics of respiration
   Principles of gas exchange regulation of respire

14. Hematology and coagulation physiology
   Blood Components
   Blood groups and blood transfusion
   Hemostasis

BIO-CHEMISTRY

Biomolecules and the cell:

Major complex biomolecules of cell and cell organelles-Prokaryotic and eukaryotic cell

Carbohydrates

Chemical structure, function- Classification- Monosaccharides- Disaccharides Polysaccharides-Homopolysaccahrides-Heteropolysaccharudes-Glycoproteins

Proteins:

Amino acids- Classification- Structure of proteins- Determination of protein structure- Properties of proteins- Denaturation- Classification of proteins- Antigen, Antibody- Types, Plasma proteins- Blood clotting.

Lipids:

Chemical structure, functions, Classification-fatty acids Triacylglycerols, Phospholipids, glycoproteins, Lipoproteins- Steroids - Amphipathic lipids.

Nucleic acids:

Purines and pyrimidine- Structure of DNA – Watson & Crick model of DNA - Structure of RNA – Types of RNA

Enzymes:

Definition – Nomenclature – Classification – Factors affecting enzyme activity – Active site – Coenzyme – Enzyme Inhibition – Mechanism of enzyme action – Units of enzyme – Isoeznzymes – Enzyme pattern in diseases.

Vitamins & Minerals:

Fat soluble vitamins (A, D, E, K) – Water soluble vitamins – B-complex vitamins- principal elements (Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and sulphur)- Trace elements – Calorific value of foods – Basal metabolic rate (BMR) – respiratory quotient (RQ) Specific dynamic action (SDA) – Balanced diet – Marasmus – Kwasoirkar

Hormones:

Classification – Mechanism of action – Hypothalamic hormones – Pitutary – Anterior,

posterior – Thyroid – Adrenal cortex, Adrenal medulla – Gonadal hormones – Menstrual cycle – GI hormones

Acids and bases:

Definition, pH, Henderson – Hasselbalch equation, Buffers, Indicators, Normality, Molarity, Molality, fluid and electrolyte balance.

BIOCHEMISTRY SYLLABUS FOR PRACTICALS–(UNDERGRADUATES)

QUALITATIVE TESTS OF MONOSACCHARIDES (GLUCOSE AND FRUCTOSE)

1. Molisch's test
2. Fehling's test
3. Benedict's test
4. Seliwanoff's test

QUALITATIVE TESTS OF LIPIDS

1. Solubility tests
2. Emulsification tests
3. Saponification tests

QUALITATIVE TESTS OF PROTEINS

1. Isoelectric precipitation test
2. Heat coagulation tests

PAPER - II

1. PATHOLOGY, MICROBIOLOGY, CLINICAL FEATURES AND TREATMENT OF DISEASES PERTINENT TO CARDIAC TECHNOLOGY

GENERAL PATHOLOGY

1. **Introduction**, Concept of Disease, Cell Injury Causes, Cellular Responses to Stress & Notorious Stimuli, Cellular Adaptation of Growth & Differentiation – Atrophy, Hypertrophy, Hyperplasia and Metaplasia.
2. **Cell Injury** – **Reversible Injury** – Types, Morphology, Intracellular Accumulations, Fatty Change, Cellular Ageing
3. **Cell Injury – Irreversible Injury** – Types, Morphology, Necrosis, Apoptosis, Dystrophic and Metastatic Calcification
4. General Features of **Inflammation**, History, Stimuli for Acute Inflammation, Vascular & Cellular Events, Chemical Mediators.
5. **Chronic Inflammation**- Causes, Features and Examples
6. **Wound Healing**, Regeneration, Repair & Fracture Healing
7. **Edema** – Types with Examples, Hyperemia, Chronic Venous Congestion & Hemorrhage
8. **Thrombosis** – Etiopathogenesis, Morphology and Fate of Thrombus
9. **Embolism** – Etiopathogenesis and Morphology
10. Gangrene And Shock
11. **Vitamin Deficiencies** and Associated Cardiovascular Disorders.

SYSTEMIC PATHOLOGY

i. THE BLOOD VESSELS AND LYMPHATICS

- **Hypertension**– etiopathogenesis, clinical features, morphology and complications
- **Atherosclerosis** – etiopathogenesis, morphology, complications, genetic factors and clinical implications
- **Vasculitis** - infectious arteritis, non-infectious arteritis – types, clinical features and morphology.
- **Aneurysms**- types, etiopathogenesis, clinical features and morphology

ii. Heart

- **Heart failure** - etiology, types of heart failure, compensatory mechanisms
- **Congenital heart disease** malpositions of the heart, shunts (cyanotic congenital heart disease), obstructions (obstructive congenital heart disease)
- **Ischaemic heart disease**, etiopathogenesis, lab diagnosis, effects of myocardial ischaemia, gross and microscopic features.
- **Rheumatic fever and rheumatic heart disease** –
- Etiopathogenesis and morphology
- **Endocarditis,** atypical verrucous (libman-sacks) endocarditis, non-bacterial thrombotic (cachectic, marantic) endocarditis, infective (bacterial) endocarditis – types, etiology and morphology
- **Valvular diseases and deformities** – etiopathogenesis, types, clinical features and morphology
- **Cardiomyopathy** - cardiac hypertrophy and dilatation – etiopathogenesis, types and morphology.
- **Myocardial diseases** - myocarditis, cardiomyopathy - etiopathogenesis, types and morphology
- **Pericardial diseases**, pericardial fluid accumulations, pericarditis – types and morphology
- **Tumours of the heart** – types, gross and microscopic features.
- Stress myocarditis, covid myocarditis, viral myocarditis and viral induced clotting.

MICROBIOLOGY SYLLABUS

I. General Microbiology:

- Introduction and History of Microbiology Sterilization and Dis-infection General and specific Methods related to instruments and catheters used in Cardiac related conditions
- Staining: Grams and Acid Fast
- Basics in Culture Media and Identification of Bacteria Antibiotic Sensitivity Testing and its Clinical Application Hospital Infection Control Practices
- Bio Medical Waste Management

II. Immunology

- Basics of Cells and Organs of Immune System
- Types of Immunity--- Innate, Humoral and Cell mediated
- Antigen, Antibody and Antigen – Antibody reaction
- Serological and Immunological tests
- Hypersensitivity Reactions --- Anaphylaxis
- Immunodeficiency and Autoimmunity Transplantation
- Immunity and HLA Typing Immuno-haematology
- Vaccines and Universal Immunisation

III. Diseases of the Blood and Cardio Vascular System

- Diseases transmitted by blood and blood products Mechanism of transmission and its Prevention
- Rheumatic fever --- Aetiology, pathogenesis, Laboratory diagnosis and Prevention
- Infective Endocarditis: Aetiology, pathogenesis, Laboratory diagnosis and Prevention
- Hepatitis B and C virus – Structure, Pathogenesis, lab diagnosis and prevention
- HIV --- Structure, Pathogenesis, Lab diagnosis and Prevention
- Sepsis—Aetiology, Pathogenesis, Lab diagnosis and Prevention
- Device Associated Infections --- Aetiological agents, Mechanism of transmission, Bio films and Prevention

IV: **Practicals:**

- Spotters demonstration for identification and two points for identification.
- Grams Staining - Procedure, observation and Reporting
- Acid Fast Staining - Procedure, observation and Reporting
- Problem Solving Exercise - Simple case studies related To Blood and Cardio vascular conditions in which Cardiac technologist has a role to perform.

2. PHARMACOLOGY RELATED TO CARDIAC TECHNOLOGY

Course objective:

This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

1. Anti-anginal agents

Beta blockers-propranolol, atenolol, metoprolol, bisoprolol carvedilol, esmolol. Nitrates-nitroglycerine, isosorbide dinitrate, isosorbide mononitrate, transdermal nitrate patches

Calcium channel blockers-nifedipine, verapamil, dilteazem, amlodipine Nicorandil, Trimetazidine, Ranolazine, Ivabradine,

2. Anti-failure agents

Diuretics-furosemide, torsamide, thiazide diuretics, metolazone, spironolactone, combination diuretics

Angiotensin converting enzyme (ACE) inhibitors ARB (Angiotensin Receptor Blocker) – Valsartan Cosartan Telmisartan – captopril Enalapril, ramipril, lisinopril, ACE inhibitors for diabetics and hypertensive renal disease

Digitalis and acute ionotropes – digoxin, odoubutamine, dopamine, adrenaline, noradrenaline, isoprenaline

Beta Blockers – Carvidilol, Bisoprolol, metaprolol

3. Anti-hypertensive drugs

Diuretics, beta-blockers, ACE inhibitors, calcium antagonists, direct Vasodilators, centrally acting and peripherally acting vasodilators.

Angiotensin Receptor Blocker – Valsartan Losartan Telmisartan olmesartan

4. Anti- arrhythmic agents

Amiodarone, adenosine, verapamil, diltiazem, lidocaine, mexiletine, Phenytoin, flecainide,

bretylium, atropine, Isoprenaline

5. Antithrombotic agents
Platelet inhibitors: aspirin, clopidogrel, Prasugrel, ticagrelor Anticoagulants: heparin, low molecular weight heparin, warfarin fondaparinux Fibrinolytics: streptokinase, urokinase Tenectaplase reteplase Glycoprotein 2b3a antagonists: abciximab, tirofiban, eptifibatide

6. Lipid lowering and anti-atherosclerotic drugs: statins, estimibe, niacin, fenofibrate

7. Miscellaneous drugs Protamine
Narcotics: morphine, pethidine, fentanyl
Sedatives: diazepam, midazolam
Steroids: hydrocortisone, oprednisolone,
Antihistamines: diphenhydramine
Antibiotics: pecicillins, cephalosporins, aminoglycosides Antacids and proton pump inhibitors
Anaesthetic agents: local general

PAPER – III

MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGERELEVANT TO CARDIAC TECHNOLOGY

Syllabus

Introduction to medical physics

Blood pressure recording

Pressure transducers

Defibrillators

Cathode ray tubes and physiological monitors

Impedence plethysmography

Pulse oximetry

Medical ultrasound and Doppler

Ionic currents and Electrocardiography

Electrocardiographic processing and display system

Radiation physics

Techniques of monitoring radiation exposure

Measures to reduce radiation exposure

Computer use in medical care and data entry

2. BASIC ELECTROCARDIOGRAPHY (ECG)

Syllabus

Fundamental principles of electrocardiography Cardiac electrical field generation during activation Cardiac wave fronts
Cardiac electrical field generation during ventricular recovery Electrocardiographic lead systems Standard limb leads
Precordial leads and the Wisdom central termina Augmented limb leads
The hexaxial reference frame and electrical axis Recording adult and pediatric ECGs
The normal electrocardiogram Atrial activation
The normal P wave
Artial repolarization

Atrioventricular node conduction and the PR segment

Ventricular activation and the QRS complex

Ventricular recovery and ST-T wave

U wave Normal

variants
Rate and rhythm (To Include in IInd Year)

ENGLISH

Communication: - Role of communication

Defining Communication

Classification of communication

Purpose of communication

Major difficulties in communication

Barriers to communication

Characteristics of successful communication – The seven Cs Communication at the work place

Human needs and communication "Mind mapping" Information communication

Comprehension passage: -

Reading purposefully

Understanding what is read

Drawing conclusion

Finding and analysis

Explaining: -

How to explain clearly

Defining and giving reasons

Explaining differences

Explaining procedures

Giving directions

Writing business letters: -

How to construct correctly

Formal language

Address

Salutation

Body

Conclusion

Report writing: -

Reporting an accident

Reporting what happened at a session

Reporting what happened at a meeting

BASICS OF COMPUTER

COURSE CONTENT:

Introduction to computer – I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes. MB, GB their conversions – large computer – Medium, Micro, Mini computers – Different computer languages – Number system – Binary and decimal conversions – Different operating system – MS DOS – Basic commands – MD, CD, DIR, TYPE and COPY CON commands – Networking – LAN, WAN, MAN (only basic ideas)

Typing text in MS word – Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion – Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document – Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document.

Creating table in MS-Excel – Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets – Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets.

Preparing new slides using MS-POWERPOINT – Inserting slides – slide transition and animation – Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.

Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E-mail ID creation

– Sending messages – Attaching files in E-mail – Introduction to "C" language – Different variables, declaration, usage – writing small programs using functions and sub – functions. Java, c+ Hoops – To prepare a Excel sheet and Video conference in CCTV footage reading.

PRACTICAL

- Typing a text and aligning the text with different formats using MS- Word Inserting a table with proper alignment and using MS-Word
- Create mail merge document using MS-word to prepare greetings for 10 friends Preparing a slide show with transition, animation and sound effect using MS-PowerPoint
- Customizing the slide show and inserting pictures and tables in the slides using MS-PowerPoint

- Creating a worksheet using MS-Excel with data and sue of functions Using MS-Excel prepare a worksheet with text, date time and data Preparing a chart and pie diagrams using MS-Excel
- Using Internet for searching, uploading files, downloading files creating e-mail ID Using C language writing programs using functions

SECOND YEAR
Syllabus

PAPER I- CLINICAL FEATURES AND TREATMENT RELATED CARDIAC TECHNOLOGY AND BASIC LIFE SUPPORT

Review of anatomy and physiology of blood and cardio vascular system, Assessment-History and Physical assessment • Etiology, Pathophysiology, clinical manifestations, diagnosis, treatment modalities of:

- Vascular system
- Hypertension, Hypotension
- Artherio sclerosis
- Raynaud's disease
- Aneurism and Approaches to Peripheral vascular disorders Heart
- Coronary artery diseases
- Ischemic Heart Disease
- Artherosclerosis Angina pectoris
- Myocardial infarction
- Valvular disorders of the heart
- Congenital and acquired - Rheumatic Heart diseases
  Infective Endocarditic, congenital heart diseases
- Endocarditis, Pericarditis Myocarditis
- Cardio Myopathies
- Cardiac dysrhythmias, Heart Block
- Congestive cardiac failure Cor-pulmonale, pulmonary edema, cardiogenic shock, cardiac tamponade
- Cardiac emergencies and arrest
- Cardio Pulmonary Resuscitation (CPR)
- Cardiac disrrthmia and Heart Block

Drugs used in treatment of Blood and cardio vascular disorders
Whole Blooded Plasma and PCD – Pathology and illness – Approach to Paediatric Patients
Airway Management
Anaphylaxis
Approach to Shock
Initial Management of Shock
Approach to Syncope
Approach to Restless Patient
Approach to Pediatric Patients
Safe transfer of patients to definitive care areas
Approach to Trauma Patients

PAPER - II - ADVANCED ELECTRO CARDIOGRAPHY (ECG)

The abnormal electrocardiogram

Left atrial abnormality

Right atrial abnormality

Left ventricular hypertrophy and enlargement

Right ventricular hypertrophy and enlargement

Intraventricular conduction delays

Left anterior fascicular block

Left posterior fascicular block

Left bundle branch block

Right bundle branch block

Myocardial ischemia and infarction Repolarization (ST-Twave) abnormalities

QRS changes

Evolution of electrocardiographic changes

Localization of ischemia or infarction

Non-infarction Q waves

Primary and secondary T wave change

Electrolyte and metabolic ECG abnormalities

Cardiac arrhythmias

Ventricular premature beats

Supra-ventricular tachycardias

Atrial flutter/fibrillation

Ventricular Tachycardia/Ventricular fibrillation

Atrio Ventricular block

Prolonged PR interval

Mobitz type 1 and 2 block

Complete heart block Direct Current (DC) shock

Defibrillator

Monophasic and biphasic shock

Technique of cardioversion

Indications for cardioverion

Textbook recommended:

Introduction to Electrocardiography-Schamroth

TREADMILL EXERCISE STRESS TESTING AND 24 HOUR AMBULATORY ECG (HOLTER) RECORDING AND AMBULATORY BP.

Syllabus

Exercise physiology

Exercise protocols

Lead systems

Patient preparation

ST segment displacement – types and measurement

Non-electrocardiographic observations

Exercise test indications, contra-indications and precautions

Cardiac arrhythmias and conduction disturbances during stress testing Emergencies in the stress testing laboratory

Principles of Holter Recording

Connections of the Holter

recorder Holter Analysis

Guidelines for ambulatory electrocardiography

PAPER - III. ECHOCARDIOGRAPHY

M- mode and 2D transthoracic echocardiography
Views used in transthoracic echocardiography
Doppler echocardiography: pulsed, continuous wave and colour Measurement of cardiac dimensions
Evaluation of systolic and diastolic left ventricular function regional wall motion abnormalities
Stroke volume and cardiac output assessment Transvalvular gradients
Orifice area
Continuity equation
Echocardiography in Valvular heart disease: Mitral stenosis
Mitral regurgitation
Mitral valve prolapse
Aortic stenosis
Aortic regurgitation
Infective endocarditis
Prosthetic valve assessment
Echocardiography in Cardiomyopathies: Dilated Hypertrophic
Restrictive Constrictive pericarditis
Pericardial effusion and cardiac tamponade
Echocardiographic detection of congenital heart disease: Atrial septal defect
Ventricular septal defect
Patent ductus arteriosus
Pulmonary stenosis
Tetralogy of Fallot
Coarctation of aorta
Left atrial thrombus
Left atrial myxoma
Transoesophageal echocardiography
Stress Echo Cardiography and Contrast Echo Cardiography

Text book recommended:

Echocardiography – Feigenbaum

THIRD YEAR

I. Cardiac catheterization laboratory basics (3months)
II. Cardiac catheterization laboratory advanced (9months)

PAPER - I. CARDIAC CATHETERIZATION LABORATORY BASICS

Type of catheters
Catheter cleaning and packing
Techniques of sterilization-advantages and disadvantages of each method preparing up the cardiac catheterization laboratory for a diagnostic study Table movement
Image intensifier movement
Image play back
Intra cardiac pressures
Pressure recording systems
Fluid filled catheters versus catheter tipped manometers
Artifacts, damping, ventricularization
Pressure gradient recording – pullback, peak – to peak
Cardiac output determination
Thermo dilution method
Oxygen dilution method
Principles of oximetry
Shunt detection and calculations.
Coronary angiography
Coronary angiographic catheters
Use of the manifold
Angiographic views in coronary angiography
Laboratory preparation for coronary angiography
Left Ventriculography – catheters, views, use of the injector
Right heart catheterization and angiography

Radiation protection

1. Catherters used in Electrophysiology studies
2. Connection of Catheters during in EP study
3. Equipment used in Arthmia, Induction and Mapping
4. Radio frequency ablation
5. ECM
6. Ventricular assist device
7. Fundaments of pace maker

PAPER – II CARDIAC CATHETERIZATION LABORATORY ADVANCE

Aortic angiography – aortic root, arch, abdominal aorta
Peripheral angiography and carbon dioxide angiography
Catheterization and angiography in children with congenital heart disease
Contrast agents

Ionic and non-ionic

Types of non-ionic agents

Contrast nephropathy

Measures to reduce incidence of contrast nephropathy

Coronary angioplasty (PTCA)

- Equipment and hardware used in PTCA: Guiding catheters
- Guidewires
- Balloons
- Stents
- Setting up the laboratory for a PTCA case
- Management of complications:
- Slow flow/no flow
- Acute stent thrombosis
- Dissection
- Perforation

Pediatric Interventions

- Aortic and pulmonary valvuloplasty
- Coarcation angioplasty and stenting
- Device closure of PDA, ASD, VSD
- Technique and devices used
- Sizing of devices Coil.
- Closure of PDAs

Balloon Mitral valvuloplasty (BMV)

- Techniques and hardware used in BMV
- Setting up the laboratory for a BMV case
- Technique and equipment used for transseptal puncture
- Recording of transmitral pressure gradients

- Management of cardiac temponade

Peripheral intercentions

- Equipment and techniques used
- Endovascular exclusion of aneurysms
- Self-expanding stents, covered stents and cutting ballons

Intra-aortic balloon pump (IABP)

- Theory of intra-aortic balloon
- Couonterpulsation
- Indications for IABP use
- Setting up the IABP system

Thromboembolic disease

- Indications and use of venacaval filters
- Techniques of thrombolysis – drug and catheters used
- Thrombus aspirations systems – coronary, peripheral
- Thrombus aspirations systems – coronary, peripheral

Cardiac pacing

- Temporary pacing – indications, technique Permanent pacing Indications
- Types of pacemakers and leads
- Setting up the laboratory for permanent pacing Pacemaker parameter checking Follow-up of pacemaker patients

Cardiac electrophysiology

- Catheters used in electrophysiology studies Connection of catheters during an EP study
- Equipment used in arrhythmia induction and mapping Radiofrequency ablation
- Image archival systems and compact disc (CD) writing

Reference Books:

Cardiac Catheterization – Grossman

ALLIED HEALTH SCIENCES EXAMINATION QUESTION PAPER PATTERN
B.Sc. DEGREE COURSES

Essay	3 x10 = 30 Marks
Short Notes	8 x 5 = 40 Marks
Short Answers	10 x 3 = 30 Marks
Total	100 Marks

EXAMINATION PATTERN – I YEAR

B.Sc. Degree in Cardiac Technology

S. No	Subjects	Theory		Practical		Internal Assessment		Viva	
		Max	Min	Max	Min	Max	Min	Max	Min
Paper I	Applied Anatomy, Physiology and Bio-Chemistry related to Cardiac Technology	100	50	50	25	50	25	-	-
Paper II	Pathology, Microbiology and Pharmacology related to Cardiac Technology	100	50	50	25	50	25	-	-
Paper III	Medical Electronics, Biophysics and computer usage relevant to cardiac Technology and Basic Electrocardiography	100	50	50	25	50	25	-	-

Internal Paper:

S. No	Subject	Theory		Internal Assessment (IA)	
		Max	Min	Max	Min
1.	* English	100	50	50	25
2.	* Computer	100	50	50	25

* English and Computer are internal papers. Marks to be sent to the university. There will be no university examination for English and Computer paper.

Internal Assessment.

Theory (20)	Practical (20)	Log Book/Project/Record (10)

* Wherever there is no Log Book/Project/ Record work the 10 marks be added to the Practical of the respective subject.

B.Sc. ALLIED HEALTH SCIENCES
EXAMINATION PATTERN – II YEAR

B.Sc. Degree in Cardiac Technology

S. No	Subjects	Theory		Practical		Internal Assessment		Viva	
		Max	Min	Max	Min	Max	Min	Max	Min
Paper I	Clinical features and treatment relevant to Cardiac Technology and Basic life support	100	50	50	25	50	25	-	-
Paper II	Advanced ECG and Treadmill exercise stress testing and 24 hours Ambulatory ECG and BP recording	100	50	50	25	50	25	-	-
Paper III	Echocardiography	100	50	50	25	50	25	-	-

B.Sc. ALLIED HEALTH SCIENCES
EXAMINATION PATTERN – III YEAR

B.Sc. Degree in Cardiac Technology

S. No	Subjects	Theory		Practical		Internal Assessment		Viva	
		Max	Min	Max	Min	Max	Min	Max	Min
Paper I	Cardiac Catheterization laboratory Basics	100	50	50	25	50	25	-	-
Paper II	Cardiac Catheterization laboratory Advanced	100	50	50	25	50	25	-	-

B. Sc., CARDIAC TECHNOLOGY
SCHEME OF EXAMINATION

ANATOMY PRACTICALS: 10 Marks

Histology spotters of 3 slides	: 3 x 1 = 3 marks
Gross anatomy spotters of 3 specimens	: 3 x 1 = 3 marks
Gross anatomy 4 specimens discussion	: 4 x 1 = 4 marks

Total : 10 marks

Internal Assessment Practical :5 marks

Viva :5 marks.

Grand Total :20 marks

PHYSIOLOGY PRACTICALS: 20 Marks
Duration: 90 Minutes

I. **MAJOR EXPERIMENTS**
Any one of the Major Experiments: 5 Marks

1. R.B.C. Count.
2. W.B.C. Count.
3. Differential Count.

II. **MINOR EXPERIMENTS**: 5 Marks
Any one of the Minor Experiments

1. Determination of Blood Groups.
2. Determination of Bleeding & Clottine time.
3. Haemoglobin Estimation.
4. Calculation of absolute Haematological Indies- MCH, MCV, MCHC.

Total: 10 Marks

IA. Marks: 5 Marks.
Viva-voce: 5 Marks.

Grand Total: 20 Marks.

BIOCHEMISTRY

Practical Examination

I. Major Practical			
Topics	No. Of Questions	Question x Marks	Total
Qualitative Analysis	1	1x3	3 Marks
II. Minor Practical			
Topics	No. Of Questions	Question x Marks	Total
Titration of simple acid- base and calculation of Normality	1	1x3	3 Marks

IA Marks: 2 Marks
Viva: 2 Marks
Grand Total: 10 Marks

PATHOLOGY PRACTICAL EXAMINATION

Duration 90 minutes
Maximum marks: 15 Marks

I. Spotters - 3 marks
II. Carryout any two Investigations- 4 marks Hb/ PCV/ WBC count/ differential count / Abs Eosinophil count / P.S. staining & reporting/ ESR/ Retic count.
III. Urine Examination - 8 marks.

General Physical Examination

Tests for Sugar, Ketone bodies, Blood & Proteins.

Internal Assessment :5 marks
Viva voce: 5 marks

MICROBIOLOGY

Duration: 90 Minutes
Practicals:

Spotters (1x5) - 5 Marks
Gram Stain - 5 Marks
ZN Stain - 5 Marks

Internal Assessment :5 marks
Viva voce: 5 marks

PAPER II.

PHARMACOLOGY RELATED TO CARDIAC TECHNOLOGY

SPOTTERS

Drugs	10 x 2 = 20
Equipment	10 x 2 = 20
Setting up a test	10 x 1 = 10
Total	50

PAPER IV

MEDICAL ELECTRONICS, BIOPHYSICS & COMPLETE USAGE RELEVANT TO CARDIAC TECHNOLOGY.

Spotters

Equipment
Parts of Computer

POSTINGS DURING ONE YEAR INTERNSHIP: -

3 MONTHS – CATH LAB AND BLOOD BANK
3 MONTHS – ECHO ROOM
3 MONTHS – ICU
3MONTHS – HOLTER (AMBULATORY ECG)