

# **Bachelor of Vocation (CARDIAC CARE TECHNOLOGY)**

## **B.Voc (CCT)**

<b>II Semester</b>				
<b>S.No.</b>	<b>Course Code</b>	<b>Subject</b>	<b>Type of Course</b>	<b>Credits</b>
1	BVCCT-201	Applied anatomy and physiology related to cardiac technology	Skill	4
2	BVCCT-203	Pharmacology related to cardiac technology	Skill	2
3	BVCCT-204	Medical electronics, biophysics and computer usage relevant to cardiac technology	Skill	2
4	BVCCT-205	General Microbiology	Skill	2
5	BVCCT-206	Communication Skills - I	General	3
6	BVCCT-206	Computing Skill - I	General	3
7	<b>BVCCTP-2</b>	<b>Vocational Practical</b>	<b>Skill</b>	<b>13</b>

### **BVCCT-201-Applied anatomy and physiology related to cardiac technology**

#### **UNIT-1**

Introduction to Anatomy (Basic Anatomical terminology)

1. Osteology: Upper limb – clavicle, scapula, humerus, radius, ulna. Lower limb - femur, hipbone, sacrum, tibia, fibula, Vertebral column
2. Thorax: Intercostal space, pleura, bony thoracic cage, ribs, sternum & thoracic vertebrae
3. Lungs: Tracheae, bronchial tree
4. Heart: Surface anatomy of heart, chambers of the heart, valves of the heart, major blood vessels of heart, pericardium, coronary arteries.
5. Myology: Muscles of thorax, muscles of upper limb (arm & fore arm), Flexor and extensor group of muscles (origin, insertion, nerve supply, action)
6. Histology: Types of tissue
  - (a) Epithelia – Squamous, Glandular, Transitional, Cartilage
  - (b) Connective tissue – bone, fibrous tissue, muscle

#### **UNIT-2**

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, Sino-atrial node function, the cardiac conduction system, Atrio-ventricular node function. Autonomic regulation of the heart rate
4. Assessment of cardiac output: Fick's principle, Thermo dilution and indicator dilution methods, Pulse Doppler methods, Miscellaneous methods
5. Hemodynamics: Relationship between pressure, flow and resistance, Frank-Starling law, Preload, after-load and contractility, Control of stroke volume and cardiac output
6. Solute transport between blood and tissues: Circulation of fluid between plasma, interstitial lymph

### **UNIT-3**

7. Vascular smooth muscle: Mechanism of contraction, Pharmaco-mechanical coupling, automaticity
8. Control of blood vessels: Local control mechanisms, Nervous control, Hormonal control

### **UNIT-4**

9. Specialization in individual circulation: Coronary circulation, cerebral circulation, pulmonary circulation, Cutaneous circulation
10. Cardiovascular receptors, reflexes and central control
11. Coordinated cardiovascular responses: Posture, Valsalva maneuver, Exercise, Diving reflex
12. Cardiovascular responses in pathological situations: Shock and hemorrhage, Syncope, Essential hypertension, chronic cardiac failure
13. Respiratory physiology: Mechanics of respiration, Principles of gas exchange regulation of respiration
14. Hematology and coagulation physiology blood components: Blood groups and blood transfusion, Hemostasis

## **202- BVCCT-Applied biochemistry in cardiac care**

### **UNIT-1**

Biomolecules and the cell: Major complex biomolecules of cell and cell organelles- Prokaryotic and eukaryotic cell

Carbohydrates: Chemical structure, function and Classification: Monosaccharides,

Disaccharides, Polysaccharides, Homopolysaccharides, Heteropolysaccharides, Glycoproteins

Proteins: Amino acids, Classification, Structure of proteins, Determination of protein, structure, Properties of proteins, Denaturation, Classification of proteins, AntiGeneral AntibodyTypes

## **UNIT-2**

Plasma proteins, Blood clotting.

Lipids: Chemical structure, functions and 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,

## **UNIT-3**

Isoenzymes, 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),

## **UNIT-4**

respiratory quotient(RQ), Specific dynamic action(SDA), Balanced diet, Marasmus, Kwashiorkor

Hormones: Classification, Mechanism of action, Hypothalamic hormones, Pituitary – Anterior, posterior; Thyroid – Adrenal cortex, Adrenal medulla; Gonadal hormones, Menstrual cycle, GI hormones

Acids and bases: Definition, pH, Henderson Hasselbach

## **BVCCT 203-Pharmacology related to cardiac technology**

### **UNIT-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, diltiazem, amlodipine

### **UNIT-2**

2. Anti-failure agents: Diuretics-furosemide, torsemide, thiazide diuretics, metolazone,

spironolactone, combination diuretics; Angiotensin converting enzyme (ACE) inhibitors – captopril, Enalapril, ramipril, lisinopril, ACE inhibitors for diabetics and hypertensive renal disease; Digitalis and acute ionotropes – digoxin, dobutamine, dopamine, adrenaline, noradrenaline, isoprenaline

### **UNIT-3**

3. Anti-hypertensive drugs: Diuretics, beta-blockers, ACE inhibitors, calcium antagonists, direct Vasodilators, centrally acting and peripherally acting vasodilators

4. Anti-arrhythmic drugs: Amiodarone, adenosine, verapamil, diltiazem, lidocaine, mexiletine, Phenytoin, flecainide, bretylium, atropine

5. Antithrombotic drugs: Platelet inhibitors: aspirin, clopidogrel; Anticoagulants: heparin, low molecular weight heparin, warfarin; Fibrinolytics: streptokinase, urokinase; Glycoprotein 2b3a antagonists: abciximab, tirofiban, eptifibatid

### **UNIT-4**

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

Miscellaneous drugs:

Narcotics: morphine, pethidine, fentanyl

Sedatives: diazepam, midazolam

Steroids: hydrocortisone, prednisolone,

Antihistamines: diphenhydramine

Antibiotics: penicillins, cephalosporins, aminoglycosides

Anesthetic drugs: local, General

Antacids and proton pump inhibitors, Protamine

## **204 -BVCCT-Medical electronics, biophysics and computer usage relevant to cardiac technology**

### **UNIT-1**

Introduction to medical physics

Blood pressure recording

Pressure transducers

Defibrillators

### **UNIT-2**

Cathode ray tubes and physiological monitors

Impedance plethysmography

Pulse oximetry

### **UNIT-3**

Medical ultrasound and Doppler

Ionic currents and Electrocardiography

Electrocardiographic processing and display system

Radiation physics

### **UNIT-4**

Techniques of monitoring radiation exposure

Measures to reduce radiation exposure

Computer use in medical care and data entry

## ***BVCCT-506- Introduction to national healthcare system***

### **UNIT-1**

#### **1. Introduction to healthcare delivery system**

- a. Healthcare delivery system in India at primary, secondary and tertiary care
- b. Community participation in healthcare delivery system
- c. Health system in developed countries.
- d. Private Sector
- e. National Health Mission
- f. National Health Policy
- g. Issues in Health Care Delivery System in India

### **UNIT-2**

2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.

### **UNIT-3**

#### **3. Introduction to AYUSH system of medicine**

- a. Introduction to Ayurveda.
- b. Yoga and Naturopathy
- c. Unani
- d. Siddha

- e. Homeopathy
- f. Need for integration of various system of medicine

#### **UNIT-4**

##### 4. Health scenario of India- past, present and future

##### Demography & Vital Statistics-

- a. Demography – its concept
- b. Vital events of life & its impact on demography
- c. Significance and recording of vital statistics
- d. Census & its impact on health policy

##### 6. Epidemiology

- a. Principles of Epidemiology
- b. Natural History of disease
- c. Methods of Epidemiological studies
- d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing aGeneralts, cold chain, immunization, disease monitoring and surveillance.

### **BVCCT-206-BASIC OF HEALTH MARKET AND ECONOMY**

#### **UNIT I**

Health Care Market An Introduction : Main Problems in the Market for Health Care, Health Care and Economic Basics, Analyzing Health Care Markets. Demand-Side Considerations: Demand for Health and Health Care, Market for Health Insurance

#### **UNIT II**

Supply-Side Considerations: Managed Care, Health Care Professionals, Hospital Services, Confounding Factors Public Policy in Medical Care: Policies to Enhance Access, Policies to Contain Costs, Medical Care Systems Worldwide,

#### **UNIT-III**

Health Sector in India: An Overview Health Outcomes; Health Systems; Health Financing Evaluation of Health Programs Costing, Cost Effectiveness and Cost-Benefit Analysis; Burden of Diseases ,Role of WHO , Health Care Budget: purpose, types & practices in Indian context.

#### **UNIT-IV**

Health Economics: Fundamentals of Economics: Scope & coverage of Health Economics, demand for

Health Sciences; Health as an investment, population, Health &Economic Development.

Tools of Economics-Concepts of need, demand, supply & price in Health Services.

Methods & Techniques of Economic Evaluation of Health Programmes: Cost benefit & cost effective methods-output & input analysis.

Market, monopoly, perfect & imperfect competition. Health Financing from various sources – Public, Private, TPA.

Economics of Health Programmes for Nutrition, diet & population control, economics of abuse of tobacco & alcohol, environmental influences on health and feeding.

Economics of Communicable (STDs & Malaria) & non-communicable (IHD & Cancers) diseases.

### **PRACTICALS:**

#### **BVCCTP-201- Practical Applied anatomy and physiology related to cardiac technology**

Demonstration of:

- Heart Surface anatomy of heart, chambers of the heart, valves of the heart, major blood vessels of heart, pericardium, coronary arteries.
- Histology: Types of tissue
- (a) Epithelia – Squamous, Glandular, Transitional, Cartilage
- (b) Connective tissue – bone, fibrous tissue, muscle
- Cardiac cycle: Mechanical events, Arterial cycle and central venous pressure cycle, Clinical aspects of human cardiac cycle
- heart rate
- Pulse Doppler methods Hemodynamics
- Preload, after-load and contractility, Control of stroke volume and cardiac output
- Vascular smooth muscle automaticity
- reflex
- transfusion, Hemostasis

#### **202- BVCCTP- Practical Applied biochemistry in cardiac care**

Demonstration of:

- Biomolecules and the cell: Major complex biomolecules of cell and cell organelles- Prokaryotic and eukaryotic cell
- Carbohydrates

- Disaccharides, Polysaccharides, Homopolysaccharides, Heteropolysaccharides, Glycoproteins
- Proteins
- Management of biochemistry lab
- safety in lab

### **BVCCTP 203-Pharmacology related to cardiac technology**

#### **Demonstration of:**

- drug used in cardiovascular system
- adverse drugs reaction

### **204 -BVCCTP- Practical Medical electronics, biophysics and computer usage relevant to cardiac technology**

#### Demonstration of:

- Blood pressure recording
- Pressure transducers
- Defibrillators
- Cathode ray tubes and physiological monitors
- Impedance plethysmography
- Pulse oximetry
- Medical ultrasound and Doppler
- Ionic currents and Electrocardiography
- Electrocardiographic processing and display system