

SARDAR PATEL UNIVERSITY
Rules-Regulations and Curriculum of
Post Graduate Diploma in Cardiac Care Technology
(PG-DCCT)

RPGDCCT-1 : A Candidate for admission to the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) must have passed B. Sc. (with any subject) of the Sardar Patel University or an examination of any other university recognized as equivalent to the above.

RPGDCCT -2 : The course of study for the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) shall be a full time course and its duration shall be of one academic year.

RPGDCCT -3 : A candidate who has passed an equivalent examining body and is seeking admission to the Institute recognized by this University shall not be admitted without producing an eligibility certificate from the Sardar Patel University.

RPGDCD -4 : To become eligible to appear in the final examination conducted by Sardar Patel University -

- a) a candidate has to complete two terms at the Institute recognized for teaching the course of studies in Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) by the university.
- b) a candidate has to keep the minimum attendance of 75% in Theory and Practical separately.
- c) a candidate has to obtain at least 35% marks in aggregate of all the papers in the internal tests conducted by the Institute.

RPGDCCT -5 : A candidate desirous of appearing at the Examination for the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) must forward his application in the prescribed form accompanied by a Certificate of attendance to the Registrar through the Head of the institute on or before the date prescribed for the purpose under the ordinance/s.

RPGDCCT -6 : For the purpose of deciding final result at this examination, the ratio internal to external marks will be 20:80 in theory & practicals. For the purpose of internal assessment the Institute will conduct at least one test in each term.

RPGDCCT -7 : The final examination for the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) shall be held at the end of the academic year.

RPGDCCT -8 : The standard of passing the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) examination will be as under:

- (a) To pass the Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) examination, a candidate must obtain at least **45% marks** (aggregate of external and internal) in theory of each subject and practical separately.
- (b) The Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) shall not be conferred upon a candidate unless he/she has passed in all the subjects of the theory examination and the practical in accordance with the provisions of relevant regulations.
- (c) Award of class will be as per the other degree examinations of faculty of Medicine, S.P. University.

RPDCCT -9: The subjects and subject-wise credits for Post Graduate Diploma in Cardiac Care Technology (PG-DCCT) will be as under.

Course Code	Title	Credits per week	Teaching hours
PGDCCT-101	Basic Medical Sciences	2	70
PGDCCT -102	Cardiac Care Technology: Introduction & Clinical	2	70
PGDCCT -103	Cardiac Care Technology: Applied & Advanced	2	70
PGDCCT -104 (P)	Cardiac Care Technology Practical	2	90
Total Teaching hours			300
Hospital Posting			750
TOTAL			1050

RPGDCD-10: Examination System and Marks distribution for Theory and Practical Examination for Post Graduate Diploma in Cardiac Care Technology will be as under.

Course Code	Title	Duration of Examination (hours)	Distribution of marks		Total
			University exam	Internal assessment	
PGDCCT-101	Basic Medical Sciences	3 hours	80	20	100
PGDCCT-102	Cardiac Care Technology: Introduction & Clinical	3 hours	80	20	100
PGDCCT-103	Cardiac Care Technology: Applied & Advanced	3 hours	80	20	100
PGDCCT-104 (P)	Cardiac Care Technology Practical	1 day	160	40	200
	Total		400	100	500

PG-DCCT-Curriculum

PGDCCT-101:

Basic Medical Sciences

(A) ANATOMY

1. Introduction: human body as a whole

- Definition of anatomy and its divisions
- Terms of location, positions and planes
- Cell and its organelles
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous & mucous glands with examples
- Basic tissues – classification with examples

2. Cardiovascular system

- Heart-size, location, chambers, exterior & interior
- Blood supply of heart
- Systemic & pulmonary circulation
- Arterial system- Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery
- Venous system; Inferior venacava, portal vein, portosystemic anastomosis , Great saphenous vein, Dural venous sinuses
- Lymphatic system- cisterna chyli & thoracic duct
- Histology of lymphatic tissues
- Names of regional lymphatics, axillary and inguinal lymph nodes in brief

3. Demonstration:

- a) Demonstration of heart and vessels in the body
- b) Histology of large artery, medium sized artery & vein, large vein
- c) Microscopic appearance of large artery, medium sized artery & vein, large vein
- d) pericardium
- e) Histology of lymph node, spleen, tonsil & thymus
- f) Normal chest radiograph showing heart shadows
- g) Normal angiograms

(B) HUMAN PHYSIOLOGY

1. Blood and Muscle Physiology:

- Composition & Function of Blood
- Erythropoiesis and Leucopoiesis
- Hemostasis
- Action potential and mechanism of Muscle contraction esp. heart muscle
- Neuromuscular junction
- Cardiovascular and Respiratory System in detail—mechanism of breathing, oxygen and carbon dioxide transport, Pulmonary volume and capacity
- Heart rate and sound
- Peripheral pulse
- Blood pressure
- Cardiac cycle and cardiac output

(C) MICROBIOLOGY

1. Morphology

- Classification of microorganisms,
- Size, shape and structure of bacteria.

2. Sterilisation and Disinfection

- Principles and use of equipments of sterilization
- Antiseptic and disinfectants

3. Hospital infection

- Causative agents, transmission methods,
- Prevention and control Hospital infection.

4. Principles and practice Biomedical waste management

(D) Pathological, Biochemical and pharmacological aspects: (in brief)

- Cardiovascular System
 - (a) Ischaemic heart diseases
 - (b) Rheumatic heart disease
 - (c) Congenital heart disease
 - (d) Hypertension
 - (e) Diabetes Mellitus and Metabolic Syndrome
 - (f) Aortic Aneurysms
 - (g) Cardiomyopathy
- Hematology
 - (a) Anaemia
 - (b) Bleeding disorders
 - (c) Laboratory tests used to diagnose bleeding disorders (in brief)

PG-DCCT-102:

Cardiac Care Technology: Introduction and clinical

A. Introduction to Cardiac Care technology

I. Electrocardiography (ECG)

1. Basic Principles

- The Electrocardiographic paper
- The Electrocardiograph
- The Electrical field of Heart—Einthoven's triangle
- The leads: Standard leads I,II,III unipolar limb leads aVR,aVL,aVF. horizontal plane leads V1-V6
- Basic ECG deflections
- Basic action of electrocardiograph

2. Normal EG

- The 'P' wave
- PR interval
- The 'qrs' complex
- T wave; the S-T segment
- QT interval,QTc interval
- The 'U' wave
- Rate & rhythm

3. The Electrical axis

4. Chamber enlargement – Right and Left atrial enlargement, LV hypertrophy & RV hypertrophy,bundle branch block ,General principles

- Right Bundle branch block
- Left bundle branch block
- The Hemi blocks (Fascicular block)

- ECG in myocardial infarction coronary insufficiency, rheumatic heart disease drug & electrolyte disturbance ,disorder of cardiac rhythm

II. Exercise stress Testing

1. Principal of Exercise testing
2. Exercise protocols
3. Exercise testing – Indication and techniques
4. Interpretation of exercise testing

III. Echocardiography

1. Principles of Echocardiography

- Basic principles of ultrasound
- M-Mode of Echocardiography
- Two dimensional Echocardiography
- Doppler Echocardiography; color flow
- Transoesophageal Echocardiography

2. Instrumentation

- Basic pulse Echo system
- Transducers
- Pulse generation
- Echo detection
- A mode, B-Mode, M-Mode
- Display & recording

3. Echocardiographic Examination

- Selecting transducers
- Position of the patient
- Placement of the transducer
- Setting control
- M-Mode labelling

- 2 D Echo
- Normal variants
- Terminology
- Identification of segments

4. Doppler Echocardiography

a. Introduction to Doppler color Echocardiography

- The Doppler principles
- Doppler ultrasound techniques
- Color Doppler flow imaging
- Clinical application of Doppler Echocardiograph

b. Physical principles & instrumentation in spectral & color Doppler flow imaging

c. Physical principles and Doppler effect. The Doppler Echocardiography system display

d. Blood flow pattern – Laminar & non-laminar flow

e. Doppler Echo cardiograph modes

- Continuous wave Doppler system
- Pulsed Doppler system
- High pulse repetition frequency
- Problems of color imaging

5. Contrast Echo

6. Echo measurements-‘ASE’ recommendation

B. Cardiac Care Technology - Clinical

1. Interpretation of Normal ECG and Basic abnormalities of ECG in RHD, IHD & CHD

2. Echo in rheumatic heart disease – Echo in mitral stenosis, mitral incompetence, aortic stenosis, aortic incompetence, pulmonary hypertension. Post AVR, post MVR. Prosthetic valve malfunction, LA clot.

3. Echo in congenital heart disease – Echo in ASD, VSD, PDA pulmonary stenosis, aortic stenosis, coarctation of aorta, TOF. dextrocardia.

4. Echo in ischemic heart disease – Echo in acute myocardial infarction, old myocardial infarction and other ischemic heart disease related conditions, LV aneurysm
5. Echo in other cardiovascular disease- Echo in various types of cardio myopathy infective endocarditis diseases of aorta, mitral valve prolapse, myxoma and other cardio vascular diseases.
6. Assessment of Cardiac function- measurements of all cardiac chambers and assessment of cardiac function
7. Echo in pericardial disease- pericardial effusion, cardiac tamponade, constrictive pericarditis
8. Cardiac catheterisation laboratory – general details of cardiac catheterisation equipment, how to handle the machine, common problems one may come across and how to overcome it, radiation hazards
9. Materials used in the cathlab- all catheters, balloons, guidewires, pacemakers contrast material and other material used in the cardiac catheterisation laboratory and sterilization of all these materials
10. Right heart catheterisation – procedure, cath position, oxymetry at various levels, angios done and its interpretation
11. Left heart catheterisation – procedure, cath position, oxymetry at various levels, angios done and its interpretation
12. Coronary angiogram – procedure, materials used, type and amount dye used, indications and contraindications, various pictures recorded in various angles and gross interpretation.
13. Peripheral angiogram – procedure, indication and contraindication

PG-DCCT- 103

Cardiac Care Technology: Applied & Advanced

A. Cardiac Care Technology - Applied

1. ECG in myocardial infarction- definition of myocardial infarction, diagnosis of myocardial infarction, ECG criteria for myocardial infarction, ECG in anterior wall, inferior wall, true posterior wall and sub endocardial infarction and RV infarction
2. ECG in rheumatic heart disease – definition of rheumatic heart disease, valvular involvement in rheumatic heart disease, ECG in mitral stenosis, mitral incompetence, aortic stenosis and aortic incompetence
3. ECG in hypertension- definition of hypertension, how to record blood pressure, ECG in hypertension
4. ECG in congenital heart disease- common congenital heart disease ASD, VSD, PDA, pulmonary stenosis, aortic stenosis, coarctation of aorta, TOF, definition of all these conditions , ECG changes in all these conditions
5. ECG in other conditions – ECG in various types of cardiomyopathy, myxoedema, pericardial effusion, acute pericarditis and other vascular diseases. Bundle branch block, WPW syndrome, dextrocardia
6. Trans esophageal echocardiogram – indications, procedure, usefulness and complications one may encounter and its management
7. Stress Echo- procedure and indications
8. Peripheral Doppler – Procedure and usefulness of peripheral Doppler
9. Coronary angioplasty–procedure, materials used, complication one may encounter and how to manage it
10. Peripheral angioplasty – materials used and procedure. Angioplasty of coarctation of aorta
11. Fetal echocardiogram – Procedure, basic interpretation
12. Contrast echocardiogram – procedure and usefulness of contrast echocardiogram
13. Myocardial contrast echo- Basic knowledge

B. Cardiac Care Technology - Advanced

1. Cardiac monitoring – definition, purpose of cardiac monitoring, how to Recognise various arrhythmias how to set up a intensive coronary care unit and usefulness of ICCU

2. Interpretation of TMT, report – criteria for TMT positive test contraindication for TMT conditions where TMT is not useful, complications that may occur in TMT room and its management
 3. Use of defibrillator- indications, how to use the defibrillator, complications during the procedure and its management
 4. Management of cardiac arrest – definition, causes external cardiac massage, artificial respiration and other drugs and procedures used in the management of Cardiac arrest
 5. Myocardial perfusion scan – procedures and usefulness of myocardial perfusion scan
 6. Cardiac arrhythmias – bradyarrhythmia and tachy arrhythmias and ECG diagnosis of all rhythm disturbances. Sinus arrhythmia, APC, FPC, VPC, VF, VT, AF, SVT, IOHB, II0HB, complete heart block
 7. Electrolyte disturbances – ECG in hypokelemlia, hyperkelemlia etc.,.
 8. Holter monitoring – procedure and usefulness
 9. Valvoplasties- procedure, indications, complications and treatment of ballons, mitral valvuloplasty, ballon aortic valvuloplasty ballon pulmonary valvuloplasty and balloon tricuspid valvuloplasty.
 10. Coil closure and device closure of PDA – procedure, indications and materials used for coil and device closure of PDA
 11. Device closure of ASD – procedure, indications and materials used for device closure of ASD
 12. Device closure of VSD – procedure, indications and materials used for device closure of VSD
 13. Electrophysiological studies – basic knowledge of EP studies mapping and ablation
 14. Oxymetry – handling of the instrument and usefulness of the instrument, normal and abnormal values.
 15. pressure recording- handling of the instrument and pressures in various chambers, normal and abnormal values
 16. Temporary and permanent pacing – materials used, procedure, complications one may encounter and management. Implantable Cardioverter defibrillator devices
 17. CD recording and storage- recording and storage of all the procedures over CD
 18. Procedure during pregnancy- precautions to be followed.
 19. Nuclear Cardiology – instrumentation, radiopharmaceuticals, patient imaging techniques.
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