EXAM SCHEME AND SYLLABUS

(Applicable for the batches admitted from the Academic Session 2023-24 onwards)

Diploma in Cath Lab Technician

(DCLT, 2 Year Diploma Programme)

FACULTY OF PARAMEDICAL SCIENCE & ALLIED HEALTH SCIENCE

Chirayu University

Bhopal, MP 462030, India

AIMS: The aim of Diploma in Cath Lab Technician program is designed to provide students with the necessary knowledge and skills to become competent professionals in the field of catheterization laboratory technology.

OBJECTIVES:

1. **Technical Competence:** Develop technical skills in operating and maintaining equipment used in catheterization procedures, such as fluoroscopy machines, angiography equipment, and other specialized tools.
2. **Patient care:** Train students to provide quality care to patients undergoing catheterization procedures. This includes understanding patient needs, ensuring their comfort, and addressing any concerns they may have.
3. **Medical Knowledge:** Provide a strong foundation in medical sciences related to cardiovascular health, anatomy, physiology, and pathology. This knowledge is essential for understanding the context and implications of cath lab procedures.
4. **Safety and Infection Control:** Emphasize the importance of safety protocols and infection control measures within the catheterization laboratory setting to protect both patients and healthcare professionals.
5. **Clinical Experience:** Offer practical, hands-on training through clinical rotations or internships in catheterization laboratories. This allows students to apply their theoretical knowledge in real-world situations under supervision.
6. **Team Collaboration:** Foster teamwork and effective communication skills, as cath lab technicians often work closely with other healthcare professionals such as cardiologists, nurses, and radiologic technologists during procedures.
7. **Ethics and Professionalism:** Instill ethical principles and professional conduct in dealing with patients, colleagues, and the healthcare community. This includes maintaining patient confidentiality, respecting diversity, and upholding the highest standards of integrity.
8. **Problem-Solving Skills:** Develop critical thinking and problem-solving abilities to handle unexpected situations that may arise during catheterization procedures or in the cath lab environment.
9. **Continuing Education:** Encourage a commitment to lifelong learning and staying updated on advancements in cath lab technology, procedures, and healthcare practices.
10. **Certification and Accreditation:** Prepare students for certification and ensure that the program meets the necessary accreditation standards set by the council.

These aims and objectives collectively aim to produce well-rounded and skilled cath lab technicians capable of contributing effectively to cardiovascular healthcare teams. The emphasis is on a combination of theoretical knowledge, technical proficiency, and professionalism.

COURSE STRUCTURE:

Diploma in Cath Lab Technician (DCLT) is 2 Year Diploma Programme.

DURATION OF THE PROGRAM:

1. DCLT I YEAR
2. DCLT II YEAR

TEACHING DAYS: Each academic year shall consist of 160 teaching days.

SYLLABUS AND SCHEME OF EXAMINATION:

Syllabus and Scheme of examination will be the same for both first and second year.

SCHEME OF EXAMINATION:
PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

FIRST YEAR DIPLOMA IN CATH LAB TECHNICIAN EXAMINATION

S. No.	Paper	Subject	Max. Marks	Min. Passing Marks
1	Paper- I	Human Anatomy & Physiology	100	50
2	Paper- II	Cath Lab Technician	100	50
3	Paper- III	Cardiac Catheterization	100	50
4	Paper- IV	Electricity and Electrostatics & Computer Sciences	100	50

(There shall be Institutional/College level theory examination as per university notification, marks to be send to University for internal assessment purposes of university examination)

SCHEME OF EXAMINATION FOR 2ND YEAR (UNIVERSITY EXAMINATION):

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

There shall be university examination at the end of 2nd year curriculum of Paramedical Diploma in Cath Lab Technician

S. No.	Paper	Subject	Theory	Internal Assessment	Practical	Total
1	Paper- I	Human Anatomy & Physiology	100	100	100	300
2	Paper- II	Cath Lab Technician	100	100	100	300
3	Paper- III	Cardiac Catheterization	100	100	100	300
4	Paper- IV	Electricity and Electrostatics & Computer Sciences	100	100	100	300
		Total	400	400	400	1200

N.B.- 1. First year institutional /college level theory examination's awarded marks would be consider as Internal assessment marks and candidate have to getmin.50%marks in university theory examination in addition to Internal assessment marks i.e. 100 marks collectively for passing the examination.

2. UniversityPracticalexaminationof100 max. marks is inclusive of viva and candidate should get separate 50% marks i.e. 50 marks to get pass.

SYLLABUS & SCHEME OF EXAMINATION

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER-I: HUMAN ANATOMY & PHYSIOLOGY

SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
Paper- I	Human Anatomy& Physiology	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The examination shall be of 100 marks with **Section – A: Anatomy** and **Section – B : Physiology** .

The theory examination marks for Anatomy shall be 50 max marks and for Physiology 50 max marks respectively. There shall be two question paper setters / evaluators, one from Anatomy and one from Physiology .Section- A, which will be set by Anatomy examiner (50 marks) and Section-B, by Physiology(50 marks)examine; 50% shall be the minimum passing marks. Internal assessment will be of100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner (Asst. Professor, Anatomy/Physiology) - one internal Examiner ; from the institute /college and one from other college /institute of the university from the panel of University examiners.

The pattern of theory examination for each section (A and B)will be as under for **50 Max. Marks**.

No. and Type of Questions	Marks for each Question	Total Marks
05 Very short answer Questions *Answer to be given in 50-60 words*	**02**	**10**
03 Short answer Questions *Answer to be given in250-300 words*	**08**	**24**
01 Essay type Questions *Answer to be given in 450-500 words*	**16**	**16**
Total Marks		**50**

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER-I:HUMAN ANATOMY & PHYSIOLOGY

General Anatomy: 40 Hrs. (Theory)
General Physiology: 40 Hrs.(Theory)

SYLLABUS CONTENTS:-

A) Applied Anatomy& Physiology:

- Study of the structure of a cell.
  Normal anatomical structure, Histology & Functions (Physiology) of the following systems.
- The circulatory system(Heart &Blood Vessels)
  The Respiratory system
  The Digestive system
  Liver & Pancreas
  Lymphatic system
  Urinary system
  Reproductive system–Male &Female Endocrine system
  Central nervous system(Brain & Spinal cord)

PRACTICAL (80 hrs.)

Anatomy &Physiology **M.M.100Marks**

(1) Demonstration of parts of body and landmarks on the surface.
(2) The skeletal system, Head &Neck.

THORAX AND ABDOMEN: -

- Demonstration of various organs within thorax & abdomen.
- Respiratory systems, pleurae, heart, liver, gallbladder, peritoneum stomach & intestine.
- Spleen, pancreas& parts of urinary system

SYLLABUS & SCHEME OF EXAMINATION

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

Paper – II: Cath Lab Technician

SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-II	Cath Lab Technician	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of100 marks and question paper setter will be Asst. Professor, Medicine, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiners (Asst. Professor, Medicine) –one internal Examiner ;from the institute/college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	**02**	**20**
5short answer Questions Answer to be given in 250-300 words	**10**	**50**
2 essay type Questions Answer to be given in450-500 words	**15**	**30**
Total Marks		**100**

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

Paper–II: Cath Lab Technician

Teaching hours:60hrs.

SYLLABUS CONTENTS:

(1) Cardio-vascular pharmacology.

(2) Electrocardiography -Electro physiology, Einthevenrnis law

Introduction to ECG Reading normal and Abnormal ECG.

(3) Cardio pulmonary resuscitation

(4) Electricity-Power Supply system, Ohm's Law CRT.TUBE multi-meter.

(5) Electromed, equipment standards and safety

ECG Maintenance of minimum repairs

(6) Applied aspects of Ultrasound/Doppler principles and practice.

(7) Defibrillator-indication, operation and indications and Precautions.

(8) Arrhythmia's conduction/abnormalities, pacemaker

(9) Stress ECG principles, methods of recording and observation.

(10) Halter Recording-principles ,methods of recording and observations.

(12) Introduction to cardiac catheterization.

SYLLABUS & SCHEME OF EXAMINATION

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER III: CARDIAC CATHETERIZATION

SCHEME OF EXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-III	Cardiac Catheterization	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of100 marks and question paper setter will qualified examiner of Medicine/Cardiology- M.D. Medicine, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiners of Medicine/Cardiology - M.D. Medicine - one internal Examiner; from the institute /college and one from other college /institute of the university from the panel of University examiners.
The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	**02**	**20**
5short answer Questions Answer to be given in 250-300 words	**10**	**50**
2 essay type Questions Answer to be given in450-500 words	**15**	**30**
Total Marks		**100**

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER III: CARDIAC CATHETERIZATION

Teaching hours : 60hrs.

SYLLABUS CONTENTS:

1. Introduction

1. Normal Physiology
2. Vascular Resistance
3. Vascular Heart disease.
   - **(1)** Steno tic Lesions
   - **(2)** Regurgitate Lesions.

4. Congenital Heart Disease
   - **(1)** A cyanotic obstructive & Left to Right Shunt
   - **(2)** Cyanotic CHD

5. Cardiac Output–
6. L.V. Function assessment–
7. Coronary Graft Angio –
8. Coronary Graft Angio –
9. Oxygen consumption calculation–
10. Exercise and Cath–
11. PTCA(Parcutan Trans mural coronary Angiography)–
12. Valvuloplasty
   - (i) Mitral Valvuloplasty.
   - (ii) Aortic Valvuloplasty.
   - (iii) Pulmonary Valvuloplasty.

13. IABP(Intra Aortic Balloon pump)–
14. CPR–
15. Pressure recording–
16. Care of the patient following cardiac catheterization–
17. Post–Angioplasty care post valvuloplasty cares–
18. Pre-Cath evaluation with checklists–
19. Pre PTCA evaluation with checklists–
20. Pre–Valvuloplasty evaluation checklists–
21. Emergency cardiac Cath and coronary angiogram–
22. Permanent Pace Maker implantation aftercare–
23. Radiology
   a. Single plain
   b. Bi-plain.
   c. DSA.
   d. angulations.

24. Film developing/processing–

SYLLABUS & SCHEME OF EXAMINATION

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER-IV:ELECTRICITYAND ELECTROSTATICS & COMPUTER SCIENCES

SCHEMEOFEXAMINATION

Paper	Subject	Theory	Internal Assessment	Practical	Total
PAPER-IV	Electricity and Electrostatics &Computer Sciences	100	100	100	300

INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of 100 marks and question paper setter will be qualified examiner of Physics or Computer teaching, who shall be on the panel of examiners of internal or external, 50% shall be the minimum passing marks. Internal assessment willbeof100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiners of Physics or Computer teaching - one internal Examiner ;from the institute/college and one from other college/institute of the university from the panel of University examiners.
The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

No. and Type of Questions	Marks for each Question	Total Marks
10 very short answer Questions Answer to be given in 50-60 words	**02**	**20**
5short answer Questions Answer to be given in 250-300 words	**10**	**50**
2 essay type Questions Answer to be given in450-500 words	**15**	**30**
Total Marks		**100**

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

Paper-IV:ELECTRICITY AND ELECTROSTATICS & COMPUTER SCIENCE

Teaching hours: 60hrs

SYLLABUS CONTENT:

1. ELECTRICITY AND ELECTROSTATICS:

(a) Simple electron theory of conduction's.

(b) Resistance.

(c) The Joule, The watt.

(d) Properties of electric charge.

(e) Capacitor.

(f) Electronic potential/ potential difference(PD).

(g) Types of AC/DC.

(h) Basic of Ac/Circuits.

2. Magnetism/Electro-magnetism/Electromagnetic induction:

(a) Magnetic poles/Fields/flux and influx density.

(b) Magnetic field due to a straight and circular coil wire.

(c) The AC transformer.

2. COMPUTER SCIENCES:

I. FUNDAMENTALS:

1. Evolution of computers, contribution so feminine scientists of the field of computers, field.
2. Concepts of computer hardware, input/output devices, central processing unit, main memory, secondary memory etc.
3. Definition of instructions, programmers software.
4. Software spectrum system software, business orient applications, R & D type research S/W, real time software etc.
5. Languages–Machine languages, assembly languages, natural languages.
6. Significance of Grammarian computer languages.

II. LOGIC DIAGRAMS:

(i) Flowcharts–symbols and their significance.

(ii) Variables–simple variables array variables.

III. BASIC LANGUAGES:

1. Input/output commends, assignment, if then, if then R Statements, for Next statement, GOTO, on GOTOSTOP interactions, swapping, ascending and descending order also arrays DIM command.

Data Types : Integer, Real double precision files: Data fields, records, data files, program file sequential files, random files etc.

2. (I)Basic aspects with special emphasis on applied aspects as related to medicine, electricity, sound, pressure, properties of solids and liquids and magnetism.

(IV) Biomechanics.

(V) Electronics – Basic principles with special reference to applied aspects as related to medicine.

3. Basic aspects of computers and computer language. The lecture courses should coverall aspects of computers so as to enable the candidate to do simple programming

IV. SPECIFIC TO THIS SPECIALITY:

(i) Instrumentation and their circuits as related to the speciality. The candidate should be given training to enable him to identify the defect if any instrument goes out of order and to rectify the simple defects.

(ii) The candidate should be trained in all the technique in the concerned specialty. He should be able to do the procedure independently and know the normal and abnormal pattern of the tests.

(iii) The candidate should be taught basic aspects of anatomy, physiology of the concerned specialty account of disease states related to various test procedures to be taught.

LIST OF PRACTICALS:

1. ECG Recording pediatrics/Adult Patient.

2. Operations, calibrations and servicing of ECG.

3. Recording of Halter/Stress ECG.

4. ECG Monitoring of Patients in ICCU.

5. Ambulatory B.P. Monitoring.

6. Operations of 2-DEcho/M. Mode Doppler and CFM system and its maintenance.

7. Operation of TEE and its maintenance.

8. Operation of blood oxymeter, ventilator and ABG Machine.Operation of Taganrog and its maintenance.

1. ICCU Monitoring.

2. Control of film processing and developing.

3. Other practical in assisting in temporary Pace-Maker and Permanent Pace-Maker etc.

Book References:

Anatomy & Physiology

I. Text book of Anatomy – B.D. Chaurasia
II. Text book of Anatomy – Vishram singh 2nd Edit
III. Essential of medical physiology- K Sembulingam
IV. Text book of physiology – A.K. Jain
V. Text book of Physiology – G.K. Pal

Cath lab Technician

I. Cardiac catheterization angiography and intervention. Wolters Kluwer
II. Cath lab practical by Sandeep Mishra
III. Laboratory text diagnostic procedure Cynthia C Chernecky Barbara J. Berga
IV. Recent advance book of – Derek Rowland's Cardiology
V. Electrocardiology Colin Sachmroth
VI. Practical cardiology – Ragavendra R. Baliya
VII. Manual of Cardiology – V Jacob Jose
VIII. Practical cardiotocography - A.K. Debdas
IX. Computer Science – R.S. Salaria, Goel, P.K. Sinha