

SCHEME OF EXAMINATION & SYLLABUS
OF
PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN:

2 Years Diploma Course



Madhyapradesh Medical Science University, Jabalpur (M.P.)-India

Academic Session 2015-16 onwards

-: REGULATION:-

REGULATION FOR VARIOUS DIPLOMA COURSES (2 YEARS) IN PARAMEDICAL SUBJECTS

The objective of the courses

1. The training of the candidate registering for various diploma (2 years) courses are aimed to carry out all routine diagnostic / therapeutic test on modern hospital laboratory
2. The Diploma course is of two years
3. Eligibility for admission in all Para medical Diploma courses except Perfusionist
 - a) The candidate must have passed 10+2 with at least 40% marks in aggregate of Physics Chemistry and Biology (P C B) and for DMLT 10 + 2 (P C B) or 10 + 2 vocational (M L T)course with at least 40% marks will also be eligible
 - b) For Diploma in Perfusion Technology (perfusionist 2 years course) The candidate shall have passed B. Sc. (BIOLOGY group) with minimum 45% marks, The University will award P G Diploma in perfusion technology
4. In case of SC/ST/OBC candidates, 5% marks relaxation will be given for the admission in above said courses
5. Weight age will be given as per university rules
6. Number of seats will be 50 in each course
7. The minimum age for admission shall be 17 years on 31 December of the Academic year of admission
8. The selection of candidate will be on the basis of the entrance examination or in the absence of entrance exam, purely on merit list prepared on the basic of marks obtained in qualifying examination
9. The admissions of students into various programs should be completed by 30th November. There shall be minimum 240 teaching days in one academic year.
10. **Attendance of students:** The student should have 75% attendance in theory and 75% attendance in practical to be eligible to appear in university examination. However, only Dean/ Principal of the college are empowered to condone 10% of attendance on valid grounds. Monthly attendance of students has to be sent to the university every month from the respective affiliated colleges.(*MPMSU)
11. **Total Course Duration:** A student has to complete the course that he/she has joined with in the double the duration of the actual time taken for the completion of the course i.e.- Four Years for all Diploma Courses.

12. **Medium of instruction and examination:** In case of diploma courses the medium of instruction will be bilingual (English or Hindi) and the medium of examination will be either English or Hindi as per the convenience of the student.
13. There will be two University Examinations in one academic session.
14. For all the Diploma courses (which is of two years duration) at the end of first year, an Internal examination will be conducted at the college level itself and the result has to be sent to the University as per the scheduled notification. (These marks will be included in the Final Transcripts), and the students are eligible to appear their final year examination at MPMSU, subject to passing in first year internal examination conducted at college level. University examination will be held at the end of Two years only.
15. **Passing Marks of Examination:**
- The passing marks of examination would be 50% for each subject and also in total marks obtained for all Diploma courses. The candidate has to pass in theory and practical examination separately. For theory paper the internal assessment marks, viva-voce and theory examination marks will be counted.
 - The candidate should pass separately in two heads i.e In Theory (Theory plus Viva voce plus Internal Assessment) and also in Practical (with 50% marks).
 - The candidate has to pass separately in each subject in internal assessment examination (with 50% marks) in order to be eligible to appear in university examinations.
 - Regarding Grace Marks it was decided that total weightage of grace marks would be 5 (five), and that grace marks can be split between the subjects. There will not be any grace marks for the Practical examination.
 - Grace marks will not be added to total marks of the candidate. In Supplementary examination also similar pattern of grace marks will be followed.
16. Re-totaling & Re-valuation (Review) both should be allowed as per the university rules
17. Other rules regarding conduct of examination will be as per the university REGULATION/NOTIFICATIONS
18. Permission will be given to start the courses after the permission from M P Paramedical council (Department of Medical education, Government of M. P.)
19. Syllabus and scheme of examination shall be decided by the board of studies and Academic council of the university from time to time as per guidelines from M.P. Paramedical council
20. In order to be an examiner a faculty member should have minimum three years of teaching experience and not below the rank of the Assistant Professor and /or Demonstrator / Tutor.

21. The examination papers (Theory) will be evaluated centrally at the university
22. The examiner who evaluates the theory copy preferably be appointed as the external for practical examinations for the said course.
23. Diploma students will be eligible for supplementary examination.
24. Various Diploma courses:
 1. Anesthesia Technician
 2. X-ray Technician
 3. Gamma camera technician / Radiotherapy technician
 4. Optometrist refractonist
 5. Blood Transfusion Technician
 6. Human nutrition
 7. Dialysis technician
 8. Hospital record science
 9. Compounder (Allopathy)
 10. Diploma in clinical Biochemistry.
 11. Microbiology
 12. Optometric refraction
 13. Paramedical Ophthalmic Assistant
 14. Cath. Lab. Technician
 15. Medical Lab technology
 16. Perfusion Technology (Per fusionist)

Note: FOR OTHER PROVISION WHICH ARE NOT COVERED IN THIS CURRICULUM & SYLLABUS WILL BE APPLICABLE AS PER THE UNIVERSITY REGULATION.

MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)

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 get min. 50% marks in university theory examination in addition to Internal assessment marks i.e. 100 marks collectively for passing the examination.

2. University Practical examination of 100 max. marks is inclusive of viva and candidate should get separate 50% marks i.e. 50 marks to get pass.



MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)

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) examiner. Recognized teachers in Anatomy and Physiology with five years of experience 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 examiner (Asth. 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 <i>Answer to be given in 50-60 words</i>	02	10
03 Short answer Questions <i>Answer to be given in 250-300 words</i>	08	24
01 Essay type Questions <i>Answer to be given in 450-500 words</i>	16	16
Total Marks		50

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

There will be two separate answer book containing 20 pages for each section i.e.- Sec. A & B and no additional answer book would be provided to the student.

MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)

PARAMEDICAL DIPLOMA IN BLOOD TRANSFUSION

PAPER-I: HUMAN ANATOMY & PHYSIOLOGY

Syllabus Contents

General Anatomy: 40 Hrs. Theory & Practical

General Physiology : 40 Hrs. Theory & Practical

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

Anatomy & Physiology

M.M. 100 Marks

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

THORAX AND ABDOMEN: -

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



MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)

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 of 100 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
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		100

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

There will be only 1 single answer book containing 40 pages to answer question paper and no additional answer book would be provided to the student.

PARAMEDICAL DIPLOMA IN BLOOD TRANSFUSION

Paper – II : Cath Lab Technician

SYLLABUS CONTENTS

(1) Cardio-vascular pharmacology.	10
(2) Elector cardiography- Electrophysiology, Einthevenrnis law	10
Introduction to ECG Reading normal and Abnormal ECG.	
(3) Cardio pulmonary resuscitation	02
(4) Electricity- Power Supply system, Ohm's Law CRT. TUBE multi meter.	05
(5) Electro med, equipment standards and safety	05
ECG Maintenance of minimum repairs	
(6) Applied aspects of Ultra sound/ Doppler principles and practice.	05
(7) Defibrillator- indication, operation and indications and Precautions.	05
(8) Arrhythmia's conduction/abnormalities, pacemaker	05
(9) Stress ECG principles, methods of recording and observation.	03
(10) Holter Recording- principles, methods of recording and observations.	03
(12) Introduction to cardiac catheterization.	05



MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)

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 of 100 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 of 100 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
5 short answer Questions Answer to be given in 250-300 words	10	50
2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		100

INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

There will be only 1 single answer book containing 40 pages to answer question paper and no additional answer book would be provided to the student.

PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

PAPER III: CARDIAC CATHETERIZATION

SYLLABUS CONTENTS

1. Introduction	1Hrs.
1. Normal Physiology	2Hrs.
2. Vascular Resistance	2Hrs.
3. Vascular Heart disease.	
(1) Stenotic Lesions	2Hrs.
(2) Regurgitate Lesions.	2Hrs.
4. Congenital Heart Disease	
(1) Acyanotic obstructive & Left to Right Shunt	4Hrs.
(2) Cyanotic CHD	3Hrs.
5. Cardiac Output –	2 hrs.
6. L.V. Function assessment –	1hrs.
7. Coronary Graft Angio –	4 hrs.
8. Coronary Graft Angio –	2 hrs.
9. Oxygen consumption calculation –	2hrs.
10. Exercise and Cath –	2hrs.
11. PTCA (Percutan Transmural coronary Angiography) –	6 hrs.
12. Valvuloplasty	
(i) Mitral Valvuloplasty.	
(ii) Aortic Valvuloplasty.	
(iii) Pulmonary Valvuloplasty.	
13. IABP (Intra Aortic Balloon pump) –	2 hrs.
14. CPR –	2 hrs.
15. Pressure recording –	3hrs.
16. Care of the patient following cardiac catheterization –	2 hrs.
17. Post – Angioplasty care post valvuloplasty cares –	2 hrs.
18. Pre-cath evaluation with check lists –	1hrs.
19. Pre PTCA evaluation with check lists –	1 hrs.
20. Pre – Valvulo plasty evaluation check lists –	1 hrs.
21. Emergency cardiac cath and coronary angiogram –	2 hrs.
22. Permanent Pace Maker implantation after care –	1 hrs.
23. Radiology	
a. Single plain	
b. Bi- plain.	
c. DSA.	
d. angulations.	
24. Film developing/processing –	2 hrs.



MADHYAPRADESH MEDICAL SCIENCE UNIVERSITY, JABALPUR (M.P.)
SYLLABUS & SCHEME OF EXAMINATION
PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN
PAPER- IV: ELECTRICITY AND ELECTROSTATICS & COMPUTER
SCIENCES

SCHEME OF EXAMINATION

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 will be of 100 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

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2 essay type Questions Answer to be given in 450-500 words	15	30
Total Marks		100

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PARAMEDICAL DIPLOMA IN CATH LAB TECHNICIAN

Paper - IV: ELECTRICITY AND ELECTROSTATICS & COMPUTER

SCIENCES

SYLLABUS CONTENTS

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 in flux 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, contributions of eminent 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, programmes 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 Grammar in computer languages.

II. LOGIC DIAGRAMS:

- (i) Flow charts – 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 GOTO STOP 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 cover all 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 techniques 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 Holter/Stress ECG.
4. ECG Monitoring of Patients in ICCU.
5. Ambulatory B.P. Monitoring.
6. Operations of 2-D Echo/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.

9. Operation of Tagarno and its maintenance.

10. ICCU Monitoring.

11. Control of film processing and developing.

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

Ramhari