

DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

Duration of Course:

Duration of Para Medical Courses is 2 years followed by 6 months compulsory Post Examination Practical Training after passing of Final Examination of Para Medical Courses.

Eligibility:

Any person seeking admission into the course of study in Para Medical Courses must fulfill the following conditions:

- a) That he/she has passed the Higher Secondary or an equivalent Examination of any Indian University or duly constituted Board, with pass mark in Physics, Chemistry and Biology.
- b) That he/she has attained the age of 17 years on 1st September of the respective year of his/her admission into the course in an approved institution.
- c) That he/she has furnished a certificate of physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

Selection:

Selection for Admission to Para Medical Courses would be on Entrance Examination: Details to be notified in website (www.smfwb.in)

RULES, REGULATIONS AND SYLLABUS

PART – IV

Duration of the DMLT [Tech] Course:-

- (a) The first one year of the course shall be devoted to the training in the subjects of the Preliminary Courses.
- (b) On completion of the Preliminary Course, the Preliminary Examination will be held.
- (c) On passing the Preliminary Examination, the students shall follow for one year the curriculum of the Final Course. On completion of the course, the Final Examination will be held.

Examination for the Diploma Course:

1. No person other than a student borne on the roll of an approved training institution and studying therein at the time shall be eligible for appearing at the examination held by the Governing Body of the Faculty.
2. Every student after admission into the course of study in an approved Institution shall apply in the prescribed form **Appendix II** through the Principal/Director of the Institution with a fee of Rs.600/- to have his/her name registered in the Students' Register maintained by the Governing Body. A registration certificate bearing serial number allotted to the student will be sent to him/her through the Head of the Institution.
3. (a) There will be two examinations – (a) Preliminary and (b) Final. The examinations shall be held twice a year at such time and place as may be determined by the Governing Body.
4. All written examinations shall be of two hours' duration.
6. Every candidate for the Preliminary / Final Examinations shall apply to the Secretary, State Medical Faculty of West Bengal through the Head of the Institution where he/she is undergoing his/her study, in the prescribed form together with prescribed fee of Rs. 500/- & the necessary certificates **Appendix III.**
7. No application will be entertained unless it reaches the Secretary at least 21 days before the date notified for commencement of the examination. An application received later but not later than 14 days before the commencement of examination, may on sufficient grounds being shown and accepted, be entertained provided that a late fee of Rs.20/- is paid for the delay.
- 8..Every candidate for the Final Examination shall apply to the Secretary, State Medical Faculty of West Bengal through the Head of the Institution where he/she had been undergoing his/her course of studies, together with the necessary certificates from the Head of the Institution **Appendix IV.**
- 9.The fee payable with the application shall be such as may be prescribed by the Governing Body from time to time. The fee is not refundable on any account.

10. No such application will be entertained unless it reaches the Secretary atleast 21 days before the date notified for commencement of the examination. An application received later but not later than 14 days before the commencement of examination, may on sufficient grounds being shown and accepted, be entertained provided that a late fee of Rs.20/- is paid for the delay.
11. A candidate declared to have passed the above examinations – both Preliminary and Final – if he/she secures 50% of the total marks in each subject – Theoretical + Practical – 50%. A candidate securing 75% marks or above in any subject or subjects, shall be declared to have obtained “Distinction” in that subject or subjects, provided he/she passes in all the subjects of the examination at the same time and at his/her first appearance at the examination.
12. A candidate, who appears at the Preliminary or Final Examination for the course but fails to pass in all the subjects or in one or more subjects, may be admitted to one or more subsequent examinations in subject or subjects in which he/she failed provided, however, that he/she passes in all the subjects in three subsequent examinations within a period of two years computed from the date of the examination in which he/she appeared for the first time. If he/she does not pass the entire examination within a period of two years, as mentioned above, he/she shall have to take the whole examination in all the subjects at the time when he/she appears next.
13. A failed candidate shall have to undergo a further course of training and produce a certificate from the Head of the Institution stating that he/she has, since the date of the last examination and within the period of six months proceeding his/her re-examination, attended to the satisfaction of the Head of the Institution further course of study in the subject or subjects in which he/she failed Appendix V.
14. The general rules and regulations regarding conduct of examinations of the State Medical Faculty of West Bengal shall apply with necessary modifications for the conduct of Diploma in Laboratory Technology. Detailed rules and regulations may be framed by the Governing Body from time to time.
15. The rates of remuneration to Paper Setters, Examiners, Assistants, Inspectors and Invigilators, etc. appointed to conduct the examinations and the rates of Travelling Allowance, Daily Allowances to Examiners and Inspectors, etc., shall be such as laid down by the Governing Body.
16. The rates of remuneration to Paper Setters, Examiners, Assistants, Inspectors and invigilators etc. appointed to conduct the examinations and the rates of Traveling Allowance, Daily Allowances to Examiners and Inspectors etc. shall be such as laid down by the Governing Body.

AWARD OF DIPLOMA IN LABORATORY TECHNOLOGY : DMLT [TECH]

1. A candidate who passes successfully the Final Examination will be granted a Diploma in Medical Laboratory Technology : DMLT [Tech].
2. Every such application shall be accompanied by a certificate from the Head of the recognized Hospital, in the form given in Appendix VI, with all the particular mentioned therein and the Head of the Institution shall forward the same to the Secretary, in the form given in Appendix VII, stating whether he/she considers him/her eligible to receive the Diploma in Medical Laboratory Technology : DMLT [Tech].
3. The Governing Body may then, if satisfied that all requirements of these regulations have been fulfilled, issue the Diploma, which shall be in the form given in Appendix VIII.

Provided that the Board of Studies may, if satisfied, accordingly direct the issue of such Diploma in anticipation of the approval of the Governing Body.

Appendix I

STATE MEDICAL FACULTY OF WEST BENGAL

COURSE SYLLABUS: DMLT [TECH] COURSE REVISED ON 2013

PRELIMINARY EXAMINATION (BROAD HEADS):

PAPER I : PATHOLOGY -	i)	Clinical Pathology
	ii)	Haematology
PAPER II: MICROBIOLOGY-	i)	General Bacteriology
	ii)	Systemic Bacteriology
	iii)	Immunology & Serology
	iv)	Clinical Bacteriology
PAPER III: BIOCHEMISTRY-		

	08	Basic principles of semi or automated blood cell counters & HPLC.
	09	Drawing of peripheral blood smear, staining & stain preparation.
	10	Bone marrow aspiration methods and staining & preparation of Tray for Bone marrow aspiration and biopsy.
	11	Differential leucocyte count (peripheral smear study)
	12	Reticulocyte staining, count and preparation of stain.
	13	Erythrocyte sedimentation rate (Procedure & reading only).
	14	Basic tests for coagulopathy – BT, CT, P time, APTT.
	15	Some special test – LE cell test, RBC Osmotic fragility & Foetal Hb%.

Heamatology	16	Basics of quality control methods and Laboratory accreditation.
	17	Biosafety measures and disposal of laboratory waste.
	18	Cylochemical Stain for diagnosis/differential diagnosis of leukemia.
	19	Basic concepts of anaemia, Leukemia and hemorrhagic disorder

<i>PAPER II : MICROBIOLOGY</i>		
Subject	Sl.No.	Particulars
General Bacteriology	01	Physiology and growth requirements.
	02	Sterilisation – principles & different methods adopted.
	03	Preparation of culture media
	04	Bacterial staining – Gram/Ziehl Neelsen/others
	05	Methods of colony count & morphological identification of bacteria by colony characters, staining & motility tests.
	06	Biochemical tests and interpretation.
	07	Final identification of bacteria with High-titre sera
	08	Antibiotic sensitivity tests.
Systemic Bacteriology	01	The microbial world and the structure of microbes.
	02	Collection of specimens for microbiological examination.
	03	Methods of inoculation of culture media from different samples.
	04	Basic concept of individual Bacteria.
	05	Laboratory diagnosis of pyogenic infection.
	06	Laboratory diagnosis of Leprosy.
	07	Laboratory diagnosis of Tuberculosis.
	08	Laboratory diagnosis of URTI.
	09	Laboratory diagnosis of LRTI
	10	Laboratory diagnosis of Enteric fever.
	11	Laboratory diagnosis of Bacillary dysentery.
	12	Laboratory diagnosis of Diarrhoeal diseases.

	13	Laboratory diagnosis of Urinary tract infection
	14	Laboratory diagnosis of Meningitis.
Immunology & Serology	01	Antigens & Antibodies - definition, types, preparation & preservation.
	02	Types of Antigen and Antibody reactions.
Clinical Bacteriology	01	Laboratory diagnosis of UTI, Sore throat, diarrhoea, acute pyogenic meningitis, Food poisoning and others

PAPER IIIA & IIIB : BIOCHEMISTRY

Subject	Sl.No.	Particulars
	01	Laboratory hazards, Laboratory safety procedures, Laboratory waste disposal.
	02	Collection, Separation, preservation and transport of the biological specimens, anticoagulants.
	03	Clinical laboratory instrumentation (Balance, Oven, Water bath)
	04	Concept of solute, solvent & colloidal solution, Normal solution, Molar solution, molal solution, osmol, osmolar solution, standard solution (Primary & Secondary) ionic strength of solution.
	05	Acid, Base, Buffer (Definition, example, pK, pH, Handerson-Hasselbach's equation)
	06	Principles of Photometry, (Lambert-Beer's Law, Flamephotometry, Reflectance Fluorometry.)
	07	Ion selective electrodes. (Nernst equation, pH electrode, Sodium, Potassium electrode, PCO ₂ electrode)
	08	Chemistry of Carbohydrates.
	09	Chemistry of Lipids.
	10	Chemistry of Amino Acids and Proteins.
	11	Chemistry of Nucleic acids & nucleotides.
	12	Radioactivity (Types) of radioactive decay with examples, Radioactive half life, Units of radioactivity application of radioisotope in clinical chemistry)

	13	Electrophoresis. (Principle, types, application in clinical biochemistry, Serum & Hemoglobin electrophoresis)
	14	Detection of Drugs & Toxic substances. (Principles of Chromatography, paper & thin layer Chromatography, their application in detection of drugs & toxic substances)

DETAILED SYLLABUS - Final Course : 2nd YEAR

<i>PAPER I : PATHOLOGY</i>		
Subject	Sl.No.	Particulars
Histopathology & Cytopathology	01	Basic concepts of different mammalian tissues and their histological structure.
	02	Different human organs and their gross and histological structure and functions.
	03	Receiving of biopsy specimens at laboratory (Clinical notes/fixatives).
	04	Fixation of tissue-different fixatives and their mode of action.
	05	Methods of decalcification.
	06	Processing of tissues-protocol for manual & automated tissue processors, paraffin embedding & preparation of blocks, preparation of reagents, different techniques & application and frozen section/cryostat.
	07	Use of Microtomes, selection and maintenance of knives, technique of section cutting & mounting on slides.
	08	Staining of tissue sections, preparation of different stains, staining methods for Haematoxylin & Eosin, Reticulin, PAS, Van-Gieson, Massion's trichrome, Lipid & Mucin stains & Perl's stain.
	09	Preservation of specimens and mounting of museum specimens.
	10	Preparation of cytosmear and H&E, Papanicolaou & MGG staining of different body fluids.
	11	Fine Needle Aspiration cytology & exfoliative cytology & Buccal Smear examination.
	12	Cytochemistry & immunohistochemistry.
	13	Cytospin and cell block preparation.
Blood Banking	01	Blood Group (ABO & Rh) – methods of grouping & reverse grouping.

	02	Basic blood banking procedures – collection of blood, anticoagulants used, cross matching, different screening tests including Coomb’s Test for incomplete antibodies, preparation of different blood components for use and how to serve a requisition. Preparation of red cell suspension.
	03	Blood transfusion & hazards.
	04	Detect the time when to discard blood in Blood Bank
	05	Computerized record keeping of Blood Bank

PAPER II : MICROBIOLOGY

Subject	Sl.No.	Particulars
Immunology & Serology	01	Diagnostic serological methods – Agglutination & Flocculation, Latex agglutination tests – to be performed by the students, Elisa testing & RIA – principles and demonstration and interpretation of results of - Widal Test, VDRL Test, Aldehyde Test, ASO Titre, Rheumatoid factor, C-reactive protein, HBsAg, Anti HCV, Anti HIV.
Parasitology	01	Basic knowledge on Protozoa and helminths.
Mycology	01	General & Systemic Mycology
	02	Demonstration of Fungus in Laboratory.
Animal Care	01	Common laboratory animals – Food, Handling, Housing, Breeding.
	02	Care of normal and experimental animals.
	03	Sacrifice, postmortem and disposal.
Clinical Microbiology	01	Laboratory diagnosis of Malaria, Protozoal dysentery, Kalazar, Hook worm infection, Ascariasis, Filariasis, Taeniasis, hepatitis, Viral diarrhea, HIV/AIDS, Candidiasis, Cryptococcal meningitis.
	02	Biosafety measures.
	03	Examination of stool

	04	Quality Control
Virology	01	General & Systemic Virology

PAPER IIIA & IIIB : BIOCHEMISTRY

Subject	Sl.No.	Particulars
	01	Definition of Antigen & Antibody, Antigen-Antibody reaction, Detection of Antigen-Antibody Reactions (ELISA, RIA)
	02	Clinical Enzymology. (Definition of enzyme, classification with examples, types of enzyme-substrate reactions, assay of enzymes. End point & Kinetic, clinical importance of enzymes, isoengymes.)
	03	Disorders of Carbohydrate metabolism & their detection. (Method of measurement of glucose in plasma & urine, ADA classification of Diabetes Mellitus, Glucose Tolerance Test, Detection of gestational diabetes, Glycosylated hemoglobin, self monitoring of blood glucose).
	04	Nutritional disorders & their detection.
	05	Liver Function Tests. (Over view of anatomy & physiology of Liver, bilirubin metabolism, jaundice & its biochemical diagnosis).
	06	Renal Function Tests. (Overview of anatomy & physiology of Kidney, Clearance Tests, other biochemical tests for detection of the renal function i.e. Serum creatinine, urea, sodium, potassium, urinary micro albumin and 24 hours protein estimation in urine, urinary osmolarity).
	07	Disorders of Cardiovascular system & their laboratory detection. (Disorders of Cholesterol metabolism measurement of plasma lipoproteins, Cardiac enzymes.)
	08	Thyroid Function Tests.
	09	Pancreatic & Gastrointestinal Function Tests. (Faecal fat, Hyperamylasemia, D-Xylose absorption Test)
	10	Disorders of joints & their detection.
	11	Basic concept of laboratory automation. (Configuration of clinical laboratory analyzers).
	12	Basic concept of laboratory statistics. (Reference value, mean, median, mode, standard deviation, coefficient of variation.)
	13	Basic concept of quality control in clinical biochemistry laboratory. (Control material, Leavy Jennings Plot.)

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX II

Form of application for registration of the name of a student admitted to an approved Training institution for Diploma in Medical Laboratory Technology : DMLT [Tech]

[Vide Regulation 13]

1. Name of the student in full :
2. Address –
(a) Permanent :

- (b) Present :
3. Father's Name :
{In case of married women, her
Husband's name}
4. Age [as on the date of admission] :
5. Race – Caste or religion :
6. Name of the approved training Institution :
7. Date of admission :
8. Preliminary educational qualification :

Signature of the applicant

I hereby certify that the above particulars are true to my knowledge.

Signature of the Head of the Institute

Dated, the 20
Place :

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX III

Application for admission to the Preliminary Examination for Diploma in Medical Laboratory Technology : DMLT [Tech] Course

[Vide Regulation 6 of Part III]

To
The Secretary, State Medical Faculty of West Bengal.

Sir,

I beg to apply for admission to the ensuing Preliminary Examination for Diploma in Medical Laboratory Technology : DMLT [Tech] to be held by the Governing Body of the State Medical Faculty of West Bengal from

The required certificate from the Head of the Institution is given herewith and I have paid the prescribed fee of Rs.....in his office.

- 1. Name in full (Block letters) :
- 2. Father's Name :
- 3. Present Age :
- 4. Student Registration No. :
- 5. Permanent Address :
- 6. Present :

Dated, the20.....

Signature of the applicant in full

Certificate of the Head of the Institution

I certify as below -

[1] That the above named was admitted in this Institution for the course of Diploma in Medical Laboratory Technology :DMLT [Tech]on

[2] That previous to his/her admission, he/she has attended regularly the course of studies as laid down in the Regulations. His/her attendance in the several subjects being as below:

<u>Subject Attendance</u>	<u>Hrs. of Theoretical Lecturers</u>	<u>No of Attendance</u>
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Paper I : (Pathology)

- 1. Clinical Pathology
- 2. Heamatology

Paper II : (Microbiology)

- 1. General Bacteriology
- 2. Systemic Bacteriology
- 3. Immunology
- 4. Clinical Bacteriology

Paper IIIA & IIIB (Biochemistry)

That he/she has paid in my office the prescribed fee of Rs.500/- which is being separately remitted to the Faculty.

That his/her conduct in the Institution was satisfactory.

Signature of the Head of the Institute

Dated, the.....20

Place :

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX IV

Application for admission to the Final Examination for Diploma in Medical Laboratory Technology : DMLT [Tech]

[Vide Regulation 9 of Part III]

To
The Secretary, State Medical Faculty of West Bengal.

Sir,

I beg to apply for admission to the ensuing Final Examination for Diploma in Medical Laboratory Technology : DMLT [Tech] to be held by the Governing Body of the State Medical Faculty of West Bengal from*

The required certificate from the Head of the Institution is given herewith and I have paid the prescribed fee of Rsin his office.

I passed the Preliminary Examination in and my present age is

- 1. Name in full (Block letters) :
- 2. Father's Name :
- 3. Present Age :
- 4. Student Registration No. :
- 5. Permanent Address :
- 6. Present :

Dated, the20

Signature of the applicant in full

* State name of the training institution.

Certificate of the Head of the Institution

I certify as below -

[1] That the above named..... passed the Preliminary Examination for Diploma in Medical Laboratory Technology : DMLT [Tech] in

[2] That he/she has attended regularly in this Institution. The 2nd Year's course of studies laid down in the Regulations and fulfilled the other requirements.. His/her attendance in the several subjects being as below:

<u>Subject</u>	<u>Attendance</u>	<u>Hrs. of Theoretical Lecturers</u>	<u>No of Attendance</u>
Paper I : (Pathology)			
1. Histopathology & Cytopathology			
2. Blood Banking			
Paper II : (Microbiology)			
1. Immunology & Serology			
2. Parasitology			
3. Mycology			
4. Animal Care			
5. Clinical Microbiology			
6. Virology			
Paper IIIA & IIIB (Biochemistry)			

[3] That he/she has paid in my office the prescribed fee of Rs.500/- which is being separately remitted to the Faculty.

[4] That his/her conduct in the Institution was satisfactory.

Signature of the Head of the Institute

Dated, the.....20

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX V

(Certificate by the Head of the Institution regarding further course of training in the subject or subjects in case of a failed candidate)

[Vide Regulation 14 of Part III]

This is to certify that Sri/Sm who appeared at the Preliminary/Final Examination for the Diploma in Medical Laboratory Technology : DMLT [Tech] in20 and failed in has undergone a further course of training in the following subject/subjects since the date of the last examination to my entire satisfaction.

Sl. No.	Subject(s)	Number of Theoretical Lecturers/ Demonstrations attended
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Signature of the Head of the Institute

Dated, the..... 20

Place :

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX VI

(Certificates to be produced by students of Diploma in Medical Laboratory Technology : DMLT [Tech] after completion of Practical Training)

[Vide Regulation 2 of Part IV]

No. :

Date :

I....., hereby certify that..... [Name of the student] after passing the Final Examination for Diploma in Medical Laboratory Technology : DMLT [Tech] underwent practical training forhours during the period fromto.....under my supervision and guidance.

Signature

Name

Designation

Address

(Countersigned by the Head of the Hospital)

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX VII

[Vide Regulation 2 of Part II]

To
The Secretary
State Medical Faculty of West Bengal
Dated, the.....20

Sir,

I am to say that the under-mentioned students have passed the Final Examination for the Diploma in Medical Laboratory Technology : DMLT [Tech] held by the Faculty in20 and have thereafter undergone the practical training as required under the Regulations of which the necessary certificates arte enclosed. I certify that I consider the students to be eligible to receive the Diploma in Medical Laboratory Technology : DMLT [Tech] .

Yours faithfully,

Head of the Institution

STATE MEDICAL FACULTY OF WEST BENGAL

APPENDIX VIII

[Vide Regulation of Part II]

Diploma in Medical Laboratory Technology: DMLT [Tech]

We, the President and Members of the Governing Body of the State Medical Faculty of West Bengal, acting under the authority vested in us by Article 18 of the Statutes of the said Faculty and in accordance with the Regulations made there under with the approval of the Government of West Bengal, do hereby declare thatafter undergoing the prescribed course of training for the Diploma in Medical Laboratory Technology : DMLT [Tech], duly passed the Final Examination for the Diploma in Medical Laboratory Technology : DMLT [Tech] held by this Faculty in the month of20 with distinction.

And we, accordingly, grant him/her this Diploma in Medical Laboratory Technology : DMLT [Tech] of this Faculty.

*Dated at Kolkata, the..... day of
.....in the year*

Signed on behalf of the Governing Body of the State Medical Faculty of West Bengal.

Secretary

President

Signature of the holder