



## **Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**

### **Shri Vaishnav Institute of Paramedical Sciences**

#### **SCHEME OF EXAMINATION:**

#### **DIPLOMA IN MEDICAL LAB TECHNOLOGY (DMLT)**

#### **2024-25 Batch First Year D.M.L.T. Examination**

There shall be one paper setter external or internal for theory examination and two examiners, one internal (Chairman) and one external for practical examinations for subjects **Human Anatomy & Physiology, Microbiology & Serology, Biochemistry and Hematology & Blood Banking.**

Theory papers will of 100 max. marks and 3Hrs. time duration.

Pattern of Examination (Theory) if Maximum Marks are 100 will be as under-

No. & Type of Question	Marks for each question	Total Max. 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
		100

#### **INSTRUCTION FOR THE PAPER SETTER**

**Section-A:** This will consist of 10 very short answer type questions with answers to each question upto five lines (Fifty to sixty words) in length. All questions will be compulsory to answer. Each question will carry two marks. Total weight age of the section shall be 20 marks.

**Section-B:** This will consist of short answer questions with answers to each question upto 2 pages (250-300 words) in length. Eight questions will be set by the examiner and five must be answered by the candidate. Each question will carry 10 marks. Total weight age of the section shall be 50 marks.

**Section-C:** This will consist of essay type questions with answers to each question upto 5 pages (approx 500 words) in length. Four questions will be set by the examiner and two must be answered by the candidate. Each question will carry 15 marks. Total weight age of the section shall be 30 marks.

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

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**Scheme Of Examination: DMLT**  
**Syllabus DMLT I Year Session 2024-2025**

S.NO.	COURSE CODE	COURSE NAME	EXAMINATION SCHEME						TOTAL MARKS
			THEORY			PRACTICAL		VIVA	
			End University Exam	Mid Year Exam	Teachers Assessment	End University Exam	Mid Year Exam	End University Exam	
1	DMLT101	Human Anatomy & Physiology-I	100	60	40	100	-	-	300

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; \*Teacher Assessment shall be based on the following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs): The students will**

**CEO 1:** Rationalize the basic knowledge of human anatomy.

**CEO 2:** Develop understanding about human system histology.

**CEO 3:** Gain knowledge about functioning systems in the body.

**CEO 4:** Application of knowledge of anatomy to learn evaluation and application.

**Course Outcomes (COs) upon successful completion of this course the student will:**

**COs 1:** Understand the structure and function of a variety of cells contained in the human body.

**COs 2:** Understand the structure and function of bones. Know the major divisions of the human skeleton

**COs 3:** Relate the importance of hormones to the functioning of the human body. Describe the endocrine glands and the hormones they produce

**COs 4:** List the organs of the digestive tract by anatomical location.

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#### **Unit-1:**

##### **Cell:**

1. Structure of Human Cell: Protoplasm and Nucleus.
2. Functions of Human Cells.
3. Cellular Transportation.

#### **Unit-2:**

##### **Circulatory System I:**

1. Structure and Functions of Heart.
2. Circulations: Systemic, Pulmonary and Different Regional Circulations.
3. Heart Sounds.
4. Cardiac Output, Cardiac Index.
5. Blood Pressure: Determination of BP. Different methods for BP measurement.
6. Interpretation of Normal ECG.

#### **Unit-3: - Respiratory System I:**

1. Structure and Functions of Lungs.
2. Mechanism of Breathing.
3. Buffer system for maintenance of pH of the body.
4. Lung volumes and Capacities.
5. O<sub>2</sub> Transportation.
6. CO<sub>2</sub> Transportation.

#### **Unit-4: Digestive system I:**

1. Introduction to Digestion
2. Structure and Function of Digestive system.
3. Different digestive juices and their composition.
4. Digestion of Carbohydrate.
5. Digestion of Protein.
6. Digestion of Fats.

#### **Unit-5: Renal system I:**

1. Structure and Functions of Kidney.
2. Structure and Functions of Nephron.
3. Juxtaglomerular apparatus.
4. Glomerular Filtration Rate.
5. Formation of Urine.
6. Composition of urine and its abnormal constituents.

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#### **Unit-6: Blood:**

1. Formation of Blood Cells. Functions of Blood.
2. Structure of Haemoglobin. Functions of Haemoglobin.
3. Anemia, Polycythemia, Thrombocytopenia,
4. Leukemia.

#### **Unit-7: Basic Anatomy**

1. Basic Concepts
2. Muscular system
3. Joints
4. Musculoskeletal system.
5. Types or Bones

#### **Human anatomy & Physiology Practical's:**

1. Hb estimation by different manual methods.
2. Blood smear preparation.
3. Phlebotomy
4. Blood grouping.
5. Muscles identification according to their anatomy.
6. Identification of Different bones
7. Demonstration and Identification of Different Parts of Circulatory system.
8. Demonstration and Identification of Different Parts of Urinary system.

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#### **PRACTICAL EXAMINATION**

Students will be assessed by viva-based examination upon learning in theory, demonstration of bones, joints, muscles.

#### **RECOMMENDED READING**

1. Chaurasia, B D Human Anatomy: Regional and CBS, New Delhi Latest 3V
2. Chaurasia, B D Human Osteology CBS, New Delhi Latest
3. Singh, Inderbir Text Book of Anatomy: With Color Atlas Jaypee, New Delhi Latest 3V
4. Singh, Inderbir Text Book of Neuroanatomy Jaypee, New Delhi Latest
5. Singh, Inderbir Text Book of Human Histology Jaypee, New Delhi Latest
6. Singh, Inderbir Text Book of Human Osteology Jaypee, New Delhi Latest
7. Garg, Krishna Text Book Histology CBS, New Delhi Latest
8. Singh, Inderbir Multiple Choice Questions in Anatomy Jaypee, New Delhi Latest
9. Datta, A.K. Essentials of Human Anatomy: Neuroanatomy Current Book, Calcutta, Latest
10. Datta, A.K. Essentials of Human Anatomy: Thorax and Abdomen Current Book, Calcutta, Latest
11. Williams, Peter L Gray's Anatomy: Anatomical Basis of Churchill Livingston, New York, Latest

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**Syllabus DMLT I Year Session 2024-2025**

S.N O.	COURSE CODE	COURSE NAME	EXAMINATION SCHEME						TOTAL MARKS
			THEORY			PRACTICAL		VIVA	
			End University Exam	Mid Year Exam	Teachers Assessment	End University Exam	Mid Year Exam	End Universi ty Exam	
1	DMLT102	Biochemistry- I	100	60	40	100	-	-	300

**Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical.**

\*Teacher Assessment shall be based on the following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs): The students will:**

**CEO1:** Conferring basic knowledge about body elements.

**CEO2:** Demonstrate an understanding of elementary Biochemistry.

**CEO3:** Understanding their Structure, basic metabolism and utilization in human body.

**Course Outcomes (COs): Students should be able to:**

**COs 1:** An understanding of basic biochemistry of body elements

**COs 2:** Understanding of their utilization processes in the living system.

**COs 3:** Understanding the mechanism and the importance of different body elements.

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#### **Unit-1: Carbohydrates:**

1. Carbohydrate Metabolism
2. Structure, Dietary Sources, Digestion, Absorption, Basic Metabolism
3. Glycolysis,
4. Krebs Cycle and ETC.

#### **Unit-2: Proteins:**

1. Structure, Dietary Sources,
2. Digestion, Absorption,
3. Basic Metabolism
4. Deamination and Transamination.

#### **Unit-3: Lipids:**

1. Structure, Dietary Sources,
2. Digestion, Absorption
3. Basic Metabolism
4. Beta- Oxidation and Cholesterol Biosynthesis.

#### **Unit 4: Nucleic Acid:**

1. Structure, Dietary Sources
2. Digestion, Absorption
3. Basic Metabolism
4. Pentose Phosphate Pathway and PRPP Pathway

#### **Unit 5: Vitamins and co-enzymes:**

1. Functions of : water-soluble vitamins.
2. Fat soluble Vitamins A, D, E and K.

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#### **Unit 6: Metabolic Disorders I:**

1. Diabetes Meletus and Glucose-Galactose Malabsorption.
2. Types of Diabetes
3. Glucose estimation by GOD-POD Method

#### **Unit 7: Estimation of:**

1. Kidney function test, Liver function test
2. Blood Urea
3. S. Cholesterol

#### **Biochemistry Practical's:**

1. General tests of Carbohydrate
2. General tests of Proteins.
3. Quantitative analysis of Carbohydrate
4. Study of pH meter.
5. Blood glucose estimation
6. Qualitative analysis of Proteins in urine.

### **PRACTICAL EXAMINATION**

Students will be assessed by viva based upon learning in theory.

#### **RECOMMENDED READING:**

- 1 Varley - Clinical chemistry
- 2 TEITZ - Clinical chemistry
- 3 Kaplan - Clinical chemistry
- 4 Ramakrishna(S) Prasanna(KG), Rajra A Text cook of Medical Biochemistry Latest Ed Orient longman Bombay -1980
- 5 Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students, Latest Ed 6DAS(Debjyothi)
6. Textbook of Medical Laboratory Technology by Prafull Godkar latest edition.

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**Scheme Of Examination: DMLT**  
**Syllabus DMLT I Year Session 2024-2025**

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			THEORY			PRACTICAL		VIVA	
			End University Exam	Mid Year Exam	Teachers Assessment	End University Exam	Mid Year Exam	End University Exam	
1	DMLT103	Microbiology & Serology - I	100	60	40	100	-	-	300

**Legends:** **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical.

\*Teacher Assessment shall be based on the following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs): The students will:**

**CEO1:** To understand basic characteristics of micro-organisms

**CEO2:** To provide basic understanding of various types of micro-organisms.

**Course Outcomes (COs): Students should be able to:**

**COs 1:** Students will be able to understand the growth process of micro-organisms.

**COs 2:** Students will be able to understand various types of pathogens and their mode of actions.

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#### **Unit-I: Introduction to Microbiology:**

1. Introduction and brief history of Microbiology.
2. The scope and relevance of Microbiology.
3. The role of microbial organisms in diseases

#### **Unit-II: Bacterial Morphology**

1. Bacterial Taxonomy.
2. Morphology and Physiology of Bacteria
3. General property of bacterial cells.

#### **Unit-3:**

#### **Introduction to Microbial Sterilization Techniques & Culture Methods:**

1. Sterilization and Disinfection, Principles, and use of equipment of sterilization.
2. Handling of waste, waste segregation and management.

#### **Unit-4:**

#### **Parasitology:**

1. Introduction & classification of medically important parasites.
2. Malaria parasite, Leishmanial parasites, Tapeworms
3. E.histolytica, Giardia Primary Amoebic meningoencephalitis.

#### **Unit-5:**

#### **Growth of Bacteria**

1. Type of bacterial growth.
2. Growth forms in laboratory.
3. Bacterial Growth Curve.
4. Factors affecting Bacterial Growth.

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#### **Unit-6: Human pathogenic bacteria and lab diagnosis**

1. Definition of diseases: Epidemic, Endemic, Pandemic.
2. Tuberculosis, Diphtheria, Meningitis, Pneumonia.
3. Enteric fever, cholera, leprosy.

#### **Unit-7: Stains Use in Microbiology**

1. Introduction and the importance of stains in microbiology.
2. Types of stains.
3. Different methods of staining and their interpretations.

#### **Unit-8: Culture Media and Culture Techniques**

1. Principles of culture media.
2. Basic requirements and uses.
3. Types of culture media.
4. Aerobic and anaerobic culture methods.

#### **Unit-9: Virology**

1. Introduction to medical virology.
2. General characteristics of viruses.
3. Storage of samples for viral diagnosis.
4. Hepatitis viruses, HIV and Rotavirus.

#### **Unit-10: Serology:**

1. Antigen & Antibodies
2. Diagnosis of syphilis – VDRL test
3. RA test
4. Diagnosis of Typhoid – Widal test
5. Elisa test

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#### **Microbiology & Serology - I Practical's:**

1. Demonstration and handling of microscopes.
2. Method and procedure of Grams staining
3. Method and procedure of ZN staining.
4. Preparation of different culture media.
5. Procedures of different methods of bacterial cultures.
6. Physical agents of control by moist heat and dry heat.
7. Identification of pathogenic organisms.
8. Antibiotic susceptibility test.
9. Usage of sterilization equipment's.
10. Hanging drop method for motility
11. Counting bacterial colonies by coulter colony counter.

**Practical's will be modified as per the feasibility.**

#### **RECOMMENDED READING**

- 1 Anathanarayana & Panikar Medical Microbiology
- 2 Robert Cruckshank - Medical Microbiology - The Practice of Medical Microbiology
- 3 Chatterjee - Parasitology - Interpretation to Clinical medicine.
- 4 Rippon - Medical Mycology
- 5 Emmons - Medical mycology
- 6 Basic laboratory methods in Parasitology, 1st Ed. J P Bros, New Delhi - 199
- 7 Base laboratory procedures in clinical bacteriology, EC, J P Brothers. New Delhi

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			End University Exam	Mid Year Exam	Teachers Assessment	End University Exam	Mid Year Exam	End University Exam	
1	DMLT104	Haematology & Blood Banking-I	100	60	40	100	-	-	300

**Legends:** **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical.

\***Teacher Assessment** shall be based on the following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs): The students will:**

**CEO1.** To understand basic ideas and techniques of Pathology.

**CEO2.** understand the basic principles of pathological tests.

**Course Outcomes (COs): Students should be able to:**

**COs 1:** develop competency in techniques of Haematology.

**COs 2:** acquire knowledge and understand the basic pathologies of Blood Bank.

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#### **Unit-1:**

##### **Introduction to Pathology:**

1. Introduction and scope of Pathology.
2. Subdivisions of Pathology.
3. Ethical aspects of Pathology.
4. Laboratory organization, safety and instrumentations.

#### **Unit-2:**

##### **Basic of Hematology:**

1. Introduction to hematology.
2. Collection and preservation of blood samples.
3. Normal and absolute values of hematology.
4. Laboratory investigation hematology.

#### **Unit-3:**

##### **Techniques in Haematology**

1. Haemocytometry.
2. Morphology of different blood cells.
3. Determination of haematocrit value.

#### **Unit-4:**

##### **Investigation of other biological fluids:**

1. Compositions of Urine
2. Abnormal constituents of Urine.
3. semen analysis.

#### **Unit-5:**

##### **Blood diseases:**

1. Anemia and its type and clinical features.
2. Polycythemia and its clinical features.
3. Leukemia

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#### **Unit-6:**

##### **Introduction to Transfusion Medicine:**

1. History and discovery of Transfusion medicine.
2. ABO and Rh Blood group systems and importance of determination of blood groups.

#### **Unit-7:**

##### **Basic of Transfusion Medicine:**

1. Compatibility test in blood transfusion: Principles, Blood typing, Crossmatching
2. Coombs test. (DAT, IAT)
3. Indication and Contraindication of Blood transfusion.
4. Laboratory investigation of transfusion reaction and mismatched transfusion.

#### **Unit-8:**

##### **Transfusion related diseases:**

1. Precautions during blood donation.
2. Transfusion transmitted diseases.
3. Blood Transfusion in the operating room.

#### **Unit-9:**

##### **Haematology:**

1. Composition of blood
2. Collection of blood & anticoagulants
3. Hb estimation, TRBC count – ANAEMIAS
4. Preparation & staining of blood films
5. TWBC & DWBC count
6. Absolute values, ESR, PCV, Reticulocyte count
7. Platelet count BT & CT
8. LE cell preparation, sickling test, osmotic fragility

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#### **PRACTICAL'S**

1. Haemoglobin estimation.
2. Preparation of Blood films and staining.
3. Determination of ESR and PCV.
4. Calculation of Blood indices.
5. Demonstration of Blood banking equipments.
6. Blood donation procedures.
7. Crossmatching.
8. Separation of blood cells.
9. Various serological tests for blood screening.

#### **PRACTICAL EXAMINATION**

Students will be assessed by viva based upon learning in theory and demonstration of various components of the equipment.

#### **RECOMMENDED READING**

- Porter R. (1997) The greatest benefit to mankind: a medical history of humanity from antiquity to the present. HarperCollins, London.
  - B. Rosai J(1997). Pathology: a historical opportunity. Americal Journal of Patholog. Muir's Textbook of Pathology.
  - M.I. Filipe et.al. (202). Histochemistry in Pathology. Churchill Livingstone. London.
  - Textbook of Medical Laboratory Technology by Prafull Godkar latest edition.

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