



# NIMS UNIVERSITY

SYLLABUS

OF

DIPLOMA IN MEDICAL LAB TECHNOLOGY – DMLT10

VERSION 1.2

DIRECTORATE OF DISTANCE EDUCATION

Shobha Nagar, Jaipur-Delhi Highway (NH-11C), Jaipur- 303121  
Rajasthan, India

## DIPLOMA IN MEDICAL LAB TECHNOLOGY – DMLT10

Eligibility	:	10 <sup>th</sup>
Programme Duration	:	3 Years
Programme Objectives	:	Medical Laboratory Technology, also known as Clinical laboratory science, is an allied health/paramedical profession, which is concerned with the diagnosis, treatment and prevention of disease through the use of clinical laboratory tests. Doctors rely on laboratory technologies to detect, diagnose and treat diseases. The programme covers the basics of preclinical subjects such as Biochemistry, Pathology, Microbiology and Blood Banking. Medical Laboratory Technologists (MLT) do these tests by analyzing body fluids, tissues, blood typing, microorganism screening, chemical analyses, Cell counts of human body etc.
Job Prospects	:	After the completion of DMLT, you will find a challenging career in a hospital, Minor emergency centers, Private laboratory, Blood donor centers, Doctor's office or clinics. A technician can become a technologist through further education and work experience. Common job profiles of students after completing DMLT include: Technician in Blood Banks, Hospitals, Nursing Homes and Diagnostic Labs

**YEAR I**

<b>Course Code</b>	<b>Course Title</b>	<b>Theory/ Practical</b>	<b>Continuous Assessment (Internals)</b>	<b>Credits</b>
ENG12101	Communication for Professionals	70	30	2
ANT12101	Basic Anatomy & Physiology	70	30	5
BCH12101	Basic Biochemistry	70	30	3
BBN12101	Basic Pathology & Blood Banking	70	30	3
MBL12101	Basic Microbiology	70	30	3
ANT12101P	Basic Anatomy & Physiology	35	15	2
BCH12101P	Basic Biochemistry	35	15	2
MBL12101P	Basic Microbiology	35	15	2
TRN12101	Hospital Training-I	200		2
			<b>TOTAL</b>	<b>24</b>

**YEAR II**

<b>Course Code</b>	<b>Course Title</b>	<b>Theory/ Practical</b>	<b>Continuous Assessment (Internals)</b>	<b>Credits</b>
CSC12207	Fundamentals of Computer Science	70	30	2
ANT12202	Human Anatomy & Physiology-I	70	30	5
BCH12201	Biochemistry-I	70	30	3
BBN12201	Pathology & Blood Banking	70	30	3
MBL12201	Microbiology-I	70	30	3
BCH12201P	Biochemistry-I	35	15	2
BBN12201P	Pathology & Blood Banking	35	15	2
MBL12201P	Microbiology-I	35	15	2
TRN12201	Hospital Training-II	200		2
			<b>TOTAL</b>	<b>24</b>

**YEAR III**

<b>Course Code</b>	<b>Course Title</b>	<b>Theory/ Practical</b>	<b>Continuous Assessment (Internals)</b>	<b>Credits</b>
WCM12301	Environmental & Bio Medical Waste Management	70	30	3
ANT12301	Human Anatomy & Physiology-II	70	30	3
BCH12301	Biochemistry-II	70	30	4
PAT12301	Pathology	70	30	4
MBL12301	Microbiology-II	70	30	4
BCH12301P	Biochemistry-II	35	15	2
PAT12301P	Pathology	35	15	2
MBL12301P	Microbiology-II	35	15	2
TRN12301	Hospital Training-III	200		2
			<b>TOTAL</b>	<b>26</b>

## DETAILED SYLLABUS

**INSTRUCTIONAL METHOD:** Personal contact programmes, Lectures (virtual and in-person), Assignments, Labs and Discussions, Learning projects, Industrial Training Programmes and Dissertation.

### YEAR I

### COMMUNICATION FOR PROFESSIONALS- ENG12101

UNIT	CONTENTS
1.	<p><b>Parts of Speech:</b> Definition of all the sight parts along with examples and their use in language.</p> <p><b>Definite and Indefinite articles:</b> a, an, and, the, Definition and its uses along with examples.</p> <p><b>Types of Pronouns:</b> Personal, Reflexive, Emphatic, Demonstrative, Relative, Indefinite, Interrogative and Distributive pronouns.</p> <p><b>Noun:</b> Defining noun along with types and categories, Gender, Number case</p> <p><b>Adjective:</b> Adjective, Comparison, Adjective used as nouns, Positions of the Adjective and Correct use of Adjectives.</p> <p><b>Verb:</b> Definition, Its forms, Verbs of incomplete predication, Phrases (defining it along with examples). Adjective, Adverb and Noun Phrase.</p> <p><b>Clauses:</b> Defining it along with examples: Adverb, Adjective and Noun Clauses.</p> <p><b>Sentence and its Types:</b> Simple, Compound and Complex, Subject and Predicate (parts of a sentence), Transformation of Sentences. Active and Passive voice, Mood and Narration (Direct and Indirect speeches).</p>
2.	<p><b>Words and Phrases:</b> Word formation (prefix, suffix), Idioms, Synonyms and Antonyms, Phonetics, Speech sound, The phoneme, The syllable and IPA transcription.</p>
3.	<p><b>Business Correspondence I:</b> Paragraph writing, Introductory remarks, Principles, Writing of single paragraphs and precise writing Letter writing Quotations and Orders- Orders and tenders, Inviting and sending quotations, Placing orders and Inviting tenders.</p>
4.	<p><b>Business Correspondence II:</b> Notices, Agenda and Minutes, Application letter, Importance and function, Drafting the application, Elements structure, Preparing CV's.</p>
5.	<p><b>Applied Grammar:</b> Correct usage of Grammar, Structure of sentences, Structure of paragraphs, Enlargements of vocabulary.</p>

6.	<b>Business Writing:</b> Written composition, Precise writing and summarizing, Writing of Bibliography, and Enlargement of vocabulary.
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**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. English Grammar and Composition Wren and Martin. S. Chand & Company Ltd
- B. Intermediate English Grammar: Raymond Murphy Pub: Foundation Books, New Delhi.
- C. Eng. Grammar usage and Composition Tickoo & Subramanian Pub: S. Chand and Co.
- D. Living Eng. Structure Standard Alien.

### **BASIC ANATOMY & PHYSIOLOGY- ANT12101**

UNIT	CONTENTS
1	<b>Introduction to Human Body and Bones:</b> Classification of Bones, Skeleton and Structure of Human Bones, Bone Joints
2	<b>Overview of the Organ System:</b> Terms to describe regions, Levels of Structural Organization, Overview of Organ Systems.
3	<b>Introduction of Different Vital Organs:</b> Respiratory Organs, Circulatory Organs, Digestive System
4	<b>Introduction to Physiology:</b> Physiology – Meaning, Homeostasis, Cell, Body Fluid, Transport through Cell membrane
5	<b>Blood:</b> Properties and Composition of Blood, Functions of Blood

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Human Physiology. Author: Chatterjee (cc). Medical allied agency
- B. Concise Medical physiology. Author: Choudhary (Sujit km.). New central books Kolkata.

## **BASIC BIOCHEMISTRY- BCH12101**

UNIT	CONTENTS
1.	<b>Introduction to Medical Laboratory Technology:</b> Medical Laboratory Technology- An Introduction Medical Laboratory Technologist—Role and Responsibilities Safety Measures
2.	<b>Laboratory Glassware and Instruments:</b> Laboratory Glassware— Care and Maintenance Laboratory Equipments— Care and Maintenance
3.	<b>Sterilization of Equipments and Storage of Distilled Water:</b> Sterilization and Disinfection, Storage of Distilled Water Distilled Water—Meaning and Types of Distilled Water Plants Distilled Water—Preparation and Storage
4.	<b>Units of Measurements:</b> S.I Units System— Meaning Measurement and Conversion Factors
5.	<b>Fundamental of Physical Biochemistry:</b> Indicators Strength of a solution-Percent Solutions, Part Dilutions, Molar Solutions, Normal Solutions, Buffer Solutions <b>p<sup>H</sup>- Definitions-</b> p <sup>Ka</sup> Value, p <sup>H</sup> Measurement—Methods, Use and Maintenance of pH meter

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Title Basic Concepts in Biochemistry: A Student's Survival Guide by Hiram Gilbert McGraw Hill Professional, 1999
- B. Textbook of Biochemistry for Medical Students by Vasudevan DM, S Sreekumari  
JAYPEEDIGITAL

## **BASIC PATHOLOGY & BLOOD BANKING- BBN12101**

UNIT	CONTENTS
1	<b>Introduction to Clinical Hematology:</b> Maintenance and use of instruments and glasswares Cleaning, Disinfection and Sterilization Preparation of Stains
2	<b>Blood sample collection and use of Anti Coagulants:</b> Methods of Blood Sample Collection Venous Puncture Skin Puncture

	Arterial Puncture Anticoagulants used for blood preservation and Tests Shelf life of blood
3	<b>Red Blood Cells:</b> Normal Morphology Count Counting Blood Cells Platelet Morphology Platelet Count Anemia- Meaning, Types and Classification, Characteristics and their feature, Clinical investigation for Anemia
4	<b>Basic Hematological Techniques:</b> Cell counters : Principle, interpretation & pitfalls Stains in common use in hematology Routine stains of blood & bone marrow Staining for red cell inclusions Leucocyte Cytochemistry Tests for hemolytic anemia Other Test Test for cryoglobulins Plasma viscosity

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Human Physiology. Author: Chaterjee (cc). Medical allied agency
- B. Modern Blood Banking & Transfusion Practices by Denise Harmening-F.A. Davis Company; 5 edition (March 14, 2005)

**BASIC MICROBIOLOGY- MBL12101**

UNIT	CONTENTS
1	<b>Introduction to Microbiology:</b> Microbiology- Definitions Safety Measures in Microbiology Laboratory Care and Maintenance of Glassware
2	<b>Culture Media:</b> Types of Media Preparation of Media
3	<b>Antiseptics and Disinfectants:</b> Definition and Types Testing of disinfectants
4	<b>Major Branches of Microbiology:</b> Immunology Bacteriology Parasitology Virology



**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Essentials of Medical Microbiology by Bhatia Rajesh, Ichhpujani Rattan Lal-Jaypeedigital
- B. Microbiology: An Introduction, 9/E Tortora Publisher Pearson Education India, 2008

**BASIC ANATOMY & PHYSIOLOGY ANT12101P**

UNIT	CONTENTS
1.	<b>The Human Body:</b> Labeled Diagrams of different organs and bones.
2.	<b>The Skeletal System:</b> Identification of the Organs, Bones, Certain fundamental techniques in Histology and Museum techniques and Body Embalming.
3.	<b>Slides:</b> Demonstration of slides of Primary.
4.	<b>Collection:</b> Collection of Blood samples.
5.	<b>Blood Smears:</b> Preparation of blood smears.
6.	<b>Staining:</b> Preparation of stains, Diluting fluids, Thick thin smears and Staining procedures.
7.	<b>Cell counts:</b> RBC, WBC, Platelet and absolute eosinophils counts.
8.	<b>Hematology:</b> PCV-Erythrocyte indices.
9.	<b>RBC:</b> Reticulocytes count.
10.	<b>WBC:</b> Differential count.
11.	<b>Blood Grouping:</b> Cross matching Rh typing.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Text books of Physiology. Author : Guyton (Arthur C). Prism publishers Bangalore.
- B. Human Physiology. Author: Chatterjee (cc). Medical allied agency

## **BASIC BIOCHEMISTRY – BCH12101P**

<b>UNIT</b>	<b>CONTENTS</b>
1.	<b>Introduction to Medical Lab Technology:</b> Laboratory Management and Planning, Reception and recording of specimens, M

**ADDITIONAL READINGS:**

- A. Biochemistry – Stryer.
- B. Text Book of Medical Biochemistry – Chatterjee and Shinde

**BASIC MICROBIOLOGY– MBL12101P**

UNIT	CONTENTS
1.	<b>Instrument:</b> Compound Microscope.
2.	<b>Demonstration and Sterilization of Equipments:</b> Hot Air oven, Autoclave, Bacterial filters.
3.	<b>Demonstration:</b> Demonstration of commonly used culture media, Nutrient Broth, Nutrient Agar, Blood Agar,
4.	<b>Growth Media:</b> Chocolate agar, MacConkey medium, LJ media, Robertson Cooked meat media, Potassium Telluride media with growth, MacConkey medium with LF & NLF, NA with staph.
5.	<b>Tests:</b> Antibiotic Susceptibility Test, Demonstration of common serological tests – Widal, VRDL, ELISA.
6.	<b>Staining:</b> Grams Staining, Acid Fast Staining
7.	<b>Stool Exam:</b> Stool exam for Helminth ova
8.	<b>Hospital Visit:</b> Visit to hospital for demonstration of biomedical waste management.
9.	<b>Culture:</b> Anaerobic Culture Methods.
10.	<b>Instrument:</b> Compound Microscope.
11.	<b>Demonstration and Sterilization of Equipments:</b> Hot Air oven, Autoclave, Bacterial filters.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. [http://www.cuteri.eu/microbiologia/manuale\\_microbiologia\\_pratica.pdf](http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf)
- B. Practical Microbiology by Vasanthakumari, BI Publications Pvt Ltd, 2009

**HOSPITAL TRAINING-I-TRN12101**

YEAR II

**FUNDAMENTALS OF COMPUTER SCIENCE- CSC12207**

UNIT	CONTENTS
1.	<b>Computer Application:</b> Characteristic of Computers, Input, Output, Storage Units, CPU, Computers System.
2.	<b>Computers Organization:</b> Central Processing Unit, Control Unit, Arithmetic Unit, Instruction Set, Register, Processor Speed.
3.	<b>Memory:</b> Main Memory, Storage Evaluation Criteria, Memory Organization, Memory Capacity, Random Access Memories, Read Only Memory, Secondary Storage Devices, Magnetic Disk, Floppy and Hard Disk, Optical Disks CD-ROM, Mass Storages Devices.
4.	<b>Input Devices:</b> Keyboard, Mouse, Trackball, Joystick, Scanner, Optical Mark Reader, Bar-code reader, Magnetic ink character reader, Digitizer, Card reader, Voice recognition, Web cam, Video Cameras.
5.	<b>Output Devices:</b> Monitors, Printers, Dot Matrix Printers, Inkjet Printers, Laser Printers, Plotters, Computers Output Micro Files (Com), Multimedia Projector.
6.	<b>Operating System:</b> Microsoft Windows, An overview of different versions of Windows, Basic Windows elements, File managements through Windows. <b>Using Essential Accessories-</b> System tools, Disk cleanup, Disk defragmenter, Entertainments, Games, Calculator, Imagine-Fax, Notepad, paint, Word Pad, Recycle bin, windows Explorer, Creating folders icons.
7.	<b>Word Processing:</b> Word processing concepts, Saving, Closing and opening existing documents, Selecting text, Editing text, Finding and replacing text, Printing documents, Creating and printing merged documents, Mail merge, Character and paragraph formatting, Page designs and layout, Editing and proofing tools checking and correcting spellings, Handling graphics, Creating tables and charts, Documents templates and wizards.
8.	<b>Presentation Package:</b> Creating opening and saving presentations, Creating the look of your presentation, Working in different views working with slides, Adding and formatting text, Formatting paragraphs, Checking spelling and correcting typing mistakes, Making notes pages and handouts, Drawing and working with objectives, Adding clip art and other pictures, Designing slides shows, Running and controlling a slid show, Printing Presentations.
9.	<b>E-Mail and Internet:</b> Use of Internet and Email, Internet, Websites (Internet Sites), The Mail protocol suite.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Computer science fundamentals: an algorithmic approach via structured programming by Elizabeth A. Unger, Nasir Ahmed
- B. Computer Fundamentals by Pradeep Sinha, Priti Sinha Bpb Publications (2003)

**HUMAN ANATOMY & PHYSIOLOGY-I- ANT12202**

UNIT	CONTENTS
1	<b>Human Body and the Integumentary System:</b> Anatomy – Meaning and Types Anatomical Positions and Planes Terms to describe locations Homeostasis Classification of humans Levels of Structural Organization Overview of Organ Systems Integumentary System - Skin and its appendages Structure of the Skin Appendages of the Skin
2	<b>The Skeleto-Muscular System:</b> Classification of Bones Bone Tissues Skeleton and Structure of Human Bones Bone Joints Movements in Human Body Muscular System and Muscle Tissues
3	<b>The Nervous System:</b> General Organization of the Nervous System Histology of Neural Tissue Neuron Structure and Classification of Neurons The Brain The Spinal Cord Autonomic Nervous System
4	<b>The Endocrine System:</b> Major Endocrine Organs Hormones of the glands and their function- Hormones of anterior pituitary Hormones of the Posterior Pituitary Adrenal Glands- Hormones of the Adrenal Medulla Hormones of the Pancreatic Islets Hormones of the Thyroid Gland

	<p>Parathyroid Glands</p> <p>Sex hormones</p>
5	<p><b>Introduction to Physiology:</b></p> <p>Physiology - Meaning</p> <p>Homeostasis</p> <p>Cell</p> <p>Body Fluid</p> <p>Transport through cell membrane</p>
6.	<p><b>Muscle Nerves:</b></p> <p>Membrane Potential</p> <p>Action Potential</p> <p>Nerve Muscle Physiology-</p> <p>    Structure of Neurons</p> <p>    Classification of Neurons</p> <p>    Conduction of Impulses in Neurons</p> <p>Muscles-</p> <p>    Classification of Muscles</p> <p>    Skeletal Muscle</p> <p>    Myofibril</p> <p>    Electrical Phenomenon &amp; Ionic Fluxes</p> <p>    Molecular Basis of Muscle Contraction</p> <p>    Neuromuscular Junction</p>
7	<p><b>Blood:</b></p> <p>Blood - Properties and Composition</p> <p>Functions of Blood</p> <p>Plasma Protein-</p> <p>    Components</p> <p>    Forms</p> <p>    Functions</p> <p>Haemoglobin-</p> <p>    Structure</p> <p>    Factors affecting Haemoglobin</p> <p>    Physiological Types</p> <p>    Derivatives</p> <p>    Functions</p> <p>    Haemoglobin Breakdown</p> <p>Blood Cells-</p> <p>    Compositions and Functions of RBC</p> <p>    Compositions and Functions of WBC</p> <p>    Compositions and Functions of Platelets</p> <p>Haemopoiesis-</p> <p>    Meaning</p> <p>    Process</p> <p>    Stages of Erythropoiesis</p>

	<p>Anemia - Types</p> <p>Haemostasis- Stages</p> <p>Blood Coagulation</p> <p>Haemorrhagic Disorders</p> <p>Blood Group- ABO</p> <p>Rh</p> <p>Importance</p> <p>Blood Transfusion</p> <p>Lymphoid Tissue and Immunity</p>
8	<p><b>The Cardiovascular System:</b></p> <p>Functions of Heart</p> <p>Passage of Blood through Heart</p> <p>Cardiac Muscle</p> <p>Cardiac Pacemaker and Conduction System</p> <p>Functions of the Cardiovascular System</p> <p>Cardiac Cycle</p> <p>Heart Sounds</p> <p>The Electrocardiogram (The ECG)</p> <p>Blood Pressure</p>
9	<p><b>Respiratory System:</b></p> <p>Organization of Respiratory System</p> <p>Respiratory Divisions</p> <p>Functions of Respiratory Tract</p> <p>Functions of Respiratory System-</p> <p>    Pulmonary Ventilation</p> <p>    Changing Alveolar Volumes</p> <p>    Pulmonary Volumes</p> <p>    Pulmonary Capacities</p> <p>    Minutes of Alveolar Ventilation</p> <p>Transport of Gases-</p> <p>    Physical Principles of Gas Exchange</p> <p>    Respiratory membrane</p> <p>    Oxygen and Carbon dioxide diffusion Gradients</p> <p>    Oxygen Transport</p> <p>    Carbon Dioxide Transport</p>
10	<p><b>Digestive System:</b></p> <p>Components of GIT</p> <p>Functions of Digestive System</p> <p>Innervations of GIT-</p> <p>    Mouth (Oral Cavity)</p> <p>    Salivary Glands</p> <p>    Composition and Functions of Saliva</p> <p>    Mastication (Chewing)</p> <p>    Swallowing (Deglutition)</p>

	Stomach- Composition & Functions of Gastric Juice Pancreas- Composition and Functions of Pancreatic Juice Regulation of Pancreatic Juice Secretion Gall - Bladder and Liver- Bile Liver Small and Large Intestine- Intestinal Juices (Succus Entericus) Movements of Small Intestine Large Intestine Digestion and Absorption- Digestion and Absorption of Carbohydrates Digestion and Absorption of Proteins Digestion and Absorption of Fats
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**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Text books of Physiology. Author: Guyton (Arthor C). Prism publishers Bangalore.
- B. Human Physiology. Author : Chaterjee (cc). Medical allied agency
- C. Concise Medical physiology. Author : Choudhary (Sujit km.). New central books Kolkata.

**BIO CHEMISTRY-I- BCH12201**

UNIT	CONTENTS
1	<b>Analytical Balance:</b> Analytical Balance— An Introduction Analytical Balance—Use and Maintenance
2	<b>Preparation of Solution Reagents:</b> Standard Solutions- Types and Use of Standard Solutions Expressing Concentration of Solutions Preparation of Standard Solutions Dilution of Solution Reagents—Formulation Storage and safe Use of Chemicals and Reagents- Flammable Chemicals Corrosive Chemicals Toxic, Harmful and Irritating Chemicals



	Oxidizing Chemicals Explosive Chemicals Carcinogens Strength Normality
3	<b>Biological Specimens:</b> Collection and recording of Biological specimens Separation of Serum and Plasma Preservation and Disposal of Biological Samples/materials
4	<b>Chemistry of Carbohydrate:</b> Carbohydrates Classification of Carbohydrates Function of Carbohydrates Properties of Carbohydrates Metabolism of Carbohydrate
5	<b>Proteins and Amino acids:</b> Meaning and definition of Proteins and Amino Acids Classification of Proteins and Amino Acids Function of Proteins Properties of Amino Acids
6	<b>Chemistry of Lipids:</b> Definitions of Lipids Classification of Lipids Function of Lipids

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Biochemistry – Stryer.
- B. Text Book of Medical Biochemistry – Chatterjee and Shinde

**PATHOLOGY & BLOOD BANKING- BBN12201**

UNIT	CONTENTS
1	<b>Introduction to Clinical Hematology:</b> Instruments and Glassware used in Pathological Laboratories Cleaning, Disinfection & Sterilization Preparation of Stains
2	<b>Method of Collection of Blood Samples:</b> Methods of Blood Sample Collection Anticoagulants used in tests and preservation Shelf life of Blood
3	<b>Blood Cells and Platelets:</b> Normal morphology Count Blood Count Platelet Morphology and Platelet Count Anemia –Meaning

	Types and Classification Characteristics and their feature Clinical investigation for Anemia
4	<b>Blood Composition:</b> Functions of Blood Haemostatis <b>Basic Hematological Techniques:</b> RBC count (Red blood cell count), HB estimation (hemoglobin estimation), WBC count Erythrocyte sedimentation rate, Reticulocyte count, Determination of bleeding time (BT), clotting time (CT), and prothrombin time (PT) Blood indices
5	<b>Preparation of Blood Films:</b> Stains used in Hematology Preparation of Buffy coat smears
6	<b>Laboratory Methods Used In the Investigation of Anemia:</b> RBC morphology & Normal and Abnormal hypochromia Vitamin B <sub>12</sub> and folic acid Schilling test Serum iron and iron binding capacity Screening for sickle cell anemia
7	<b>Preparation of Smear For Diagnosis of Blood Parasites:</b> Laboratory investigations of blood parasites Test of L.E. cell.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Hand book of Blood Transfusion Therapy. Author: J.A.F. Napier. Publisher : John Wiley & Sons, Chichester, England
- B. Blood Banking and Transfusion Medicine Basic Principles practice. Author : Christopher D., Hill Yeret al. Publishers : Churchill Livingstone, Philadelphia.
- C. Test book of Blood Transfusion Banking and Transfusion Medicine. Author : Sallyv. Rhdman. Publisher : W.B. Sauders Company, Philadelphia.

## MICROBIOLOGY-I- MBL12201

UNIT	CONTENTS
1	<b>Introduction to Microbiology:</b> Microbiology- Definition and History Safety Measures in Microbiology Laboratory Care and Maintenance of Laboratory Equipments
2	<b>Morphology:</b> Structure of Bacteria Use of Microscope in the study of Bacteria
3	<b>Morphology of Bacteria:</b> Growth Requirements- Sources for Carbon and Energy Source of Nitrogen Source of Hydrogen and Oxygen Source of Calcium Source of Water Source of Minerals Environmental Factors affecting growth- The Effect of Oxygen The Effect of pH on Growth The Effect of Temperature on Growth Effect of Carbon Dioxide Effect of Osmotic Pressure Bacterial Growth- Bacterial Cell Division Generation Time Bacterial Growth Curve
4	<b>Sterilization and Disinfection:</b> Definitions Methods of Sterilization Physical methods of Sterilization- Sunlight Drying Heat Radiation Filtration Chemical methods of Sterilization
5	<b>Immunology:</b> Immunity- Innate Immunity Acquired Immunity Immunity vaccines and types Serological Tests - Principles and Interpretations-

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**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Ananthanarayanan R. and C. K. Jayaram Paniker (1997) Text of microbiology, Orient Longman.
- B. Stanier RY, Ingraham JL, Wheelis, ML Painter PR (1986). General Microbiology

**BIO CHEMISTRY-I– BCH12201P**

UNIT	CONTENTS
1	Practical I- Introduction to apparatus, Instruments and uses of chemical balance, Calculation of molecular weights and Equivalent weights. Preparation of solutions- Preparation of normal solution, Molar solutions, Percentage solution and reagents, Dilution techniques, Measurements of hydrogen ion concentration qualitative analysis, Identification of carbohydrates, Proteins and substances of biochemical importance. Demonstration of colorimeter, Spectrophotometer, Perimeter, Single pan balance Specimen- Specimen collection, Identification, Transport, Delivery and Preservation Patient preparation for tests. Disposal regulations, Workplace hazards.
2	Practical II- Anticoagulants and Preservatives Regulations and precautions regarding transport of biological specimens Preparation of high quality water, pH determination, Preparation of buffers and determination of pH Measurement of radioactivity Practical related to solvent extraction, Partition coefficient, Dialysis, Concentration, Desalting and ultracentrifugation Calibration of equipments and laboratory wares Photometry- Familiarization and usage of colorimetry, Specterophotometry, Fluorimetry, Flame photometry, Atomic absorption spectroscopy, Nephelometry, Osmometry, Chemiluminescence, ion selective electrodes, Flowcytometry Chromatography- Paper, Thin layer, Gel filtration, Ion exchange, HPLC, GLC, Separation of various sugars, Amino acids, Lipids, Drugs toxins etc. Urine aminogram.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Textbook of Practical Biochemistry By Joshi A. Rashmi  
 B. Principles & Techniques of Practical Biochemistry By Keith Wilson

## **PATHOLOGY & BLOOD BANKING – BBN12201P**

UNIT	CONTENTS
1	Practical I- Pathology Laboratory- Aim, basis, Interpretation, Safety in clinical pathology laboratory, Laboratory organization. Instruments, Glassware's, Cleaning of glassware Sample collection and Specimen labeling Routine test, Anticoagulants, Reagents, Isotonic solution, Standardization methods. Preparation of solution and Interpretation of result, Normal values. Basic requirements for hematology laboratory Complete Blood Counts, Determination of Hemoglobin, TRBC Count by Hemocytometers, TLC by Hemocytometer.
2	Practical II- Differential Leukocyte count, Determination of Platelet count, Determination of ESR by wintrobes method , Determination of ESR by Westergent's method, Determination of PCV by Wintrobes tube, Erythrocyte Indices – MCV, MCH, MCHC, Reticulocyte count, Absolute Eosinophil count, Morphology of Red Blood Cells, BT and CT, PT (prothrombin) time, Demonstration of (MP), Malaria Parasite.
3	Practical III- Bone marrow smears preparation and staining procedure – Demonstration, ABO Blood grouping, Rh typing and cross match, Performance of direct and indirect coombs test, Red cell agglutination test (screening Paul bunnell test), Blood donor selection and screening, Blood collection and preservation, Principle of clearing and preparing transfusion bottle and tubing sets – Preparation and Transfusion reaction and their investigations.
4	Practical IV- Blood Bank Administration, Record Keeping, Computerization in Blood Transfusion services, ABO Blood grouping, Rh typing various techniques, Cross Matching, Tube test, Slide Test, D <sup>u</sup> Test, Sub Grouping Test, Coombs Test, Direct coombs test, Indirect coombs test, Compatibility Testing for blood transfusion cross matching test, 5% cell suspension and 10% cell suspensions, HIV and AIDS demonstration.
5	Practical V- Urine Routine examination normal / abnormal constituents of urine, C.S.F. and other body fluids examination, Semen Analysis, Sputum test, Different types of blood test, Stool Routine examination.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. The language of pathology: an introduction to medical terminology and the nature of disease by Glyndwr Walters  
 B. Mini Atlas Pathology: 2007 By Harsh Mohan-Jaypee Brothers

## MICROBIOLOGY-I – MBL12201P

UNIT	CONTENTS
1	Practical I- Compound Microscope Demonstration and Sterilization of Equipments – Hot Air oven, Autoclave, Bacterial filters. Demonstration of commonly used Culture Media- Nutrient broth, Nutrient agar, Blood agar, Chocolate agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph.
2	Practical II- Antibiotic susceptibility test Demonstration of common serological tests – Widal, VRDL, ELISA, Grams staining, Acid Fast Staining Stool exam for Helminthic ova Visit to hospital for demonstration of Biomedical Waste Management Anaerobic Culture Methods.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. [http://www.cuteri.eu/microbiologia/manuale\\_microbiologia\\_pratica.pdf](http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf)
- B. Practical Microbiology by Vasanthakumari BI Publications Pvt Ltd, 2009

## **HOSPITAL TRAINING-II-TRN12201**

YEAR III

## ENVIRONMENTAL & BIO MEDICAL WASTE MANAGEMENT- WCM12301

UNIT	CONTENTS
1	<b>Environment Introduction:</b> Biotic and Abiotic environment, Adverse effects of Environmental Pollution, Control Strategies, Various Acts and Regulation.
2	<b>Water Pollution:</b> Water Quality Standards for potable water, Surface and underground water sources, Impurities in water and their removal, Denomination, Adverse effects of domestic waste water and industrial effluent to surface water sources, Eutrophication of lakes, Self purification of streams.

3	<b>Air Pollution:</b> Sources of air contaminations, Adverse effects on human health, Measurement of air quality standards and their permissible limits, Measure to check air pollution, Greenhouse effect, Global warming, Acid rain, Ozone depletion.
4	<b>Bio Medical Waste Management:</b> Introduction to Bio-Medical Waste, Types of Bio-Medical Waste, Collection of Bio-Medical Waste, Treatment and safe disposal of Bio-Medical Waste.
5	<b>Solid Waste Management:</b> Introduction to Solid Waste, Its collection and disposal, Recovery of resources, Sanitary land-filling, Vermin-composting, Hazardous waste management.
6	<b>Land Pollution:</b> Soil Conservation, Land Erosion, Aforestation, Ecology Business of Species, Biodiversity, Population Dynamics, Energy flow, Ecosystems
7	<b>Social Issues and the Environment:</b> Sustainable development and life style, Urban problems related to energy, Resettlement and rehabilitating of people, Environmental ethics, Consumerism and waste products, Water Harvesting and Rural Sanitation- Water harvesting techniques, Different schemes of Rural Water Supply in Rajasthan, Rural Sanitation, Septic Tank, Collection and disposal of wastes, Bio-gas, Community Awareness and participation, Miscellaneous, Non-Conventional (Renewable) sources of energy, Solar energy, Wind energy, Bio-mass energy, Hydrogen energy.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Paryavaran Shiksha. Author : Dr. A.N. Mathur, Dr. N.S. Rathore, Dr. V.K. Vijay.
- B. Paryavaran Adhyayan. Author : Dr. Ram Kumar Gujar, Dr. B.C. Jat
- C. Parayavaran Avabodh. Author : Dr. D.D. Ojha.
- D. Environmental Chemistry and Pollution Control. Author : S.S. Dora
- E. Ecology concepts and application. Author : Manuel C. Muller.

**HUMAN ANATOMY & PHYSIOLOGY-II- ANT12301**

UNIT	CONTENTS
1	<b>The Cardiovascular System:</b> Anatomy of Circulatory System Anatomy of the Heart and Blood Vessels Lymphatic System
2	<b>Respiratory System:</b> Anatomy of Respiratory System Gross Anatomy of the Lungs
3	<b>Digestive System:</b> Anatomy of Digestive System Gross Anatomy of Stomach

	<p>Regions of Small Intestine</p> <p>Regions of Large Intestine</p> <p>Accessory Glands-</p> <p>Liver</p> <p>Gall Bladder</p> <p>Pancreas</p>
4	<p><b>The Urogenital System:</b></p> <p>Anatomy of Urinary System-</p> <p>Kidney</p> <p>Ureters</p> <p>Urinary Bladder</p> <p>Urethra</p> <p>Anatomy of Genital System-</p> <p>Male Genital System</p> <p>Female Genital System</p>
5	<p><b>Nervous System:</b></p> <p>Functions of Nervous System</p> <p>Three Ventricles-</p> <p>Functions of Brain</p> <p>The Cerebrum</p> <p>Limbic System</p> <p>Functions of Basal Ganglia</p> <p>Mesencephalon</p> <p>The Cerebellum</p> <p>Brain Stem-</p> <p>The Spinal cord</p> <p>Peripheral Nervous System-</p> <p>Somatic Nervous System</p> <p>Autonomic Nervous System</p> <p>Spinal Nerves</p> <p>Cranial Nerves</p> <p>Synapse and Receptor-</p> <p>Structure of a Synapse</p> <p>Classification of Synapse</p> <p>Synaptic Transmission</p> <p>Receptors-</p> <p>Classification of Sensory Receptors</p> <p>Sensory System</p> <p>Reflexes-</p> <p>Reflex Arc</p> <p>Function of Reflexes</p> <p>Classification of Reflexes</p> <p>Ascending and Descending Tracts of Spinal Cord-</p> <p>General Arrangement of both Tracts</p>



	<p>Ascending Tracts (Sensory) Somatosensory Cortex Descending Tracts (Motor)</p> <p>Cerebrospinal Fluid- Composition of fluid Formation of fluid Circulation CSF Pressure Hydrocephalous Functions of CSF</p> <p>Autonomic Nervous System (ANS) Organization of the ANS Sympathetic nervous system Parasympathetic Nervous System Functions of Autonomic Nervous System</p>
6	<p><b>Special Senses:</b> Functions of Eye- The Wall of the Eyeball Vision Visual Pathways to the Central Cortex Refraction Errors of Refraction Colour Vision The Mechanism of Hearing</p> <p>Structure and Function of Ear- The External Ear The Middle Ear The Internal Ear Organ of Corti- The Receptor of Hearing</p>
7	<p><b>The Integumentary System:</b> Functions of Skin Body Temperature- Regulation of body temperature Applied aspects</p>
8	<p><b>The Excretory System:</b> Structure of Kidney The Nephrons- Types of Nephrons Functions of Kidney Juxtaglomerular Apparatus Renal Circulation Formation of Urine- Glomerular Filtration Tubular Reabsorption Tubular Secretion</p>

	Micturition- Micturition Reflex Cystomterogram Diuretics Artificial Kidney
9	<b>The Reproductive System:</b> Male Reproductive System- Primary Sex Organs - Testis Functions of Testis Functions of Testosterone Accessory Sex Organs Female Reproductive System - Functions of Ovaries Accessory Sex Organs Female Sexual Cycle- The Ovarian Cycle The Menstrual Cycle Ovulation Tests Pregnancy Test Parturition and Lactation- Stages of Parturition Composition of Breast Milk Advantage of Breast Feeding Fertility Control-Contraceptive Methods

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Varley – Clinical Chemistry. Author : William heinemann. Publisher : Medical books Ltd. and inter science books in Newyork.
- B. KALPLAN – Clinical Chemistry. Author : C.V. Mosoby Company. Publisher : St. Loie’s Washington.
- C. TEITZ – Clinical Chemistry. Author : William B. Publisher : Sainders Company Harcourt (India)

## BIOCHEMISTRY-II- BCH12301

UNIT	CONTENTS
1	<b>Cells and Cell Organelles:</b> Prokaryotic Cells Eukaryotic Cells Cell Organelles and subcellular fractions Subcellular fractionation Markers of subcellular organelles
2	<b>Nucleic Acids:</b> Definitions of Nucleic Acids Types of Nucleic Acids Functions of Nucleic Acids
3	<b>Enzymes:</b> Properties and classification of Enzymes Coenzymes and their characteristics Factors influencing the rate of Enzymatic Reactions Effect of Enzyme Concentration Use of Enzymes as Reagents
4	<b>Blood Glucose Regulation:</b> Glycosuria of Blood Glucose Regulation Glucose of Tolerance Test of Blood Glucose Regulation Protein Metabolism of Blood Glucose Regulation
5	<b>Urine Analysis:</b> Urine- Physicochemical Characteristics and Constituents Collection of Urine Preservation of Urine Specimen Measures of Urine- Proteinuria Glucose Ketone Bodies Bile Pigments Urobilinogen Urobilin Porphyrins Haematuria Calcium in Urine
6	<b>Clinical Chemistry:</b> Photoelectric Colorimeters Flame Photometry Beer's Law Systronic Colorimeter Spectrophotometers Clinical Chemistry- Specimen Collection and Processing Clinical Chemistry and Drug

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Varley – Clinical Chemistry. Author: William Heinemann. Publisher: Medical books Ltd. and inter science books in Newyork.
- B. KALPLAN – Clinical Chemistry. Author : C.V. Mosoby Company. Publisher : St. Loie’s Washington.
- C. TEITZ – Clinical Chemistry. Author : William B. Publisher : Sainders Company Harcourt (India)
- D. Biochemistry. Author : U. Satynarayan. Publisher : Books and allied Ltd., Kolkata 700009 (India).
- E. Text books of medical biochemistry. Author : Ramkrishan(S), Rajan(R).

**PATHOLOGY- PAT12301**

UNIT	CONTENTS
1	<b>Understanding Blood Related Diseases:</b> Leukemia – Introduction and Classification Myelodysplastic Syndromes Preleukemic Conditions Hemophilia Thalassemia Sickle Cell Anemia Blood Poisoning
2	<b>Laboratory Methods Used In Investigation of Hemolytic Anemia:</b> Osmotic Fragility Investigation of G-6 PD deficiency Test for sickling Estimation of HB-F, Hb-A2 Plasma Hemoglobin and Haptoglobin Demonstration of Hemosiderin in Urine Hemoglobin Electrophoresis Test for Auto Immune Hemolytic Anemia Measurements of Abnormal Hb Pigments
3	<b>Origin, Formation and Circulation of Blood Cells:</b> Science of blood cell formation Bone marrow Sites Hematopoiesis, Anemia introduction and classification Megaloblastic Anemia, Iron deficiency anemia and other Hypochromic Microcytic Anemia’s Hemolytic Anemias I – Introduction and Classification Aplastic Anemia Anemia of chronic disorders Malaria Bleeding disorders – Introduction and Classification- Congenital Bleeding Disorders Acquired Bleeding Disorders

4	<p><b>Blood Banking:</b>  Blood Group System  Blood Group Incompatibility—ABO, Rh &amp; Systems  Cross Matching Test in emergency  Blood Bank  Preparation of Blood-  Preparation and use of whole blood  Blood components washed red cells  Plasma preparation  Blood Collection Procedure  Screening, Selection and Care of Donor  Medical Registration and Physical Examination  Transport and Storage  Risk assessment for AIDS and Serum Hepatitis</p>
5	<p><b>Blood Grouping:</b>  ABO  RH and others system of blood groups,  Bombay group.  Antibodies to ABO system  Anti AB and Anti D Antibody,  ABO Testing slides and tube test,  Rh grouping test and slide,</p>
6	<p><b>Cross Matching:</b>  Reasons of Cross Match  Roles, formation and methods of checking followings-  Saline  Albumin  Comb's  Enzymes  Comb's test</p>
7	<p><b>Pathological Analysis:</b>  Analysis of Body fluids  Analysis of Semen  Sputum Analysis  Stool Analysis  Urine Analysis</p>

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Textbook of Pathology/ Pathology Quick Review and MCQs Harsh Mohan-JP
- B. Robbins Basic Pathology by Vinay Kumar, M.D., Abul K. Abbas, Jon C. Aster-Elsevier Health Sciences, 2012

## MICROBIOLOGY-II- MBL12301

UNIT	CONTENTS
1	<b>Systemic Bacteriology:</b> Staphylococcus Streptococcus Micrococci Pneumococcus Neisseria Corynebacteria Bacillus Clostridium Enterobacteriaceae- Klebsiella Escherichia coli Proteus Salmonella Shigella Pseudomonas Spirochetes
2	<b>Parasitology:</b> General Parasitology- Host parasite relationship Classification of parasites Protozoa Helminthes Cestodes- Taenia saginata Taenia solium Echinococcus Hymenolepis Nana Trematodes- Fasciola hepatica Schistosoma Nematodes- Trichinella spiralis Trichuris trichiura Strongyloides stercoralis
3	<b>Virology:</b> Morphology of viruses Replication of viruses Cultivation of viruses Laboratory diagnosis of viral infections
4	<b>Mycology:</b> Classification of Fungus Laboratory Diagnosis-

	Collection and transport of Specimen Direct Microscopy Fungal Culture Classification of Fungal Diseases- Superficial Mycoses Subcutaneous Mycoses Systemic Mycoses Opportunistic Mycoses
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**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Practical microbiology - Prof. C.B. Baveja.
- B. Clinical pathology & bacteriology - Sachdev K.N.
- C. Text books of microbiology - D.R. Area.
- D. Text books of medical laboratory technology - Praful Godgar.

**BIOCHEMISTRY-II- BCH12301P**

UNIT	CONTENTS
1	Practical I- Estimation of blood sugar, Glucose- Orthotoluidine and glucose oxidase methods, Urea-DAM method and urease Berthelot reaction. Serum Creatinine – Jaff’s method end point and kinetic analyses modes Serum uric acid- Phosphotungstate method Serum total proteins – Biuret method Serum Albumin- Dye binding (BCG) methods Serum Total Cholesterol- Modified Zag’s method and Enzymatic method Serum Bilirubin- Malloy Evelyn Method Vandenberg reaction- concept of Conjugated Bilirubin Total and Conjugated Bilirubin estimations.
2	Practical II- Aminotransferases - AST and ALT-Reitman Frnakel method Phosphatases : Alkaline and Acid Phosphatases King- Armstrong method ( Disodium Phenyl Phosphate) Bowers and Mc. Comb(4-Nitrophenyl phosphate) Serum Amylase: Amyloclastic method of van loon Urine Analysis- Measurement of specific gravity Identification of Sugar Ketonebodies Proteins, Blood, Bile salts, Bile pigments and Urobilinogen Standardization of different methods for estimation of Glucose, Urea Creatinine, Proteins and Transaminases Standardization of pipettes and photometric instruments Agarose gel and cellulose acetate electrophoretic separation of serum proteins, lipoproteins and haemoglobins Paper chromatographic separation of aminoacides and carbohydrates present in different body fluids.

3	<p>Practical III-</p> <p>Oral glucoses tolerance test</p> <p>Estimation of 24 hrs urine proteins by Turbidimetric method</p> <p>Plasma fibrinogen estimation by Turbidimetric method</p> <p>Plasma Prothrombin time estimation</p> <p>Estimation of HDL-Cholesterol by Phosphotungstate method</p> <p>Estimation/Demonstration of CPK, LDH, GGT, Lipase and G6PD activities in serum</p> <p>Estimation of urine 17 – Ketosteroids and VMA, CSF analysis, Pandy's and none-Apelt tests</p> <p>Estimation of proteins glucose and chlorides</p> <p>Estimation of serum calcium and inorganic phosphate</p> <p>Practice use of automated pipettes</p> <p>Demonstration working with different auto analyzers</p> <p>Practice of various quality control measures followed to maintain quality of the laboratory.</p>
4	<p>Practical IV-</p> <p>Analysis of Normal Urine, Composition of urine, Urinary screening for inborn errors of metabolism, Common renal disease, Urinary calculus, Urine examination for detection of abnormal constituents.</p> <p>Interpretation and Diagnosis through charts</p> <p>Liver Function tests</p> <p>Lipid Profile</p> <p>Renal Function test</p> <p>Cardiac markers, Blood gas and Electrolytes, Estimation of Blood sugar, Blood Urea and electrolytes</p> <p>Demonstration of Strips, Demonstration of Glucometer</p> <p>Procedure for routine screening.</p>

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Textbook of Practical Biochemistry by Joshi A. Rashmi Publisher B. Jain Publishers, 2002
- B. Practical Biochemistry, 2008 G - Reference, Information and Interdisciplinary Subjects Series by Y. M. Shivaraja Shankara Jaypee Brothers Publishers, 2008

**PATHOLOGY – PAT12301P**

UNIT	CONTENTS
1	<p>Practical I-</p> <p>Introduction to Histo Pathology</p> <p>Receiving of Specimen in the laboratory</p> <p>Grossing Techniques, Mounting Techniques – various Mountants</p> <p>Maintenance of records and filing of the slides</p> <p>Use &amp; care of Microscope</p> <p>Various Fixatives, Mode of action</p> <p>Preparation and Indication</p> <p>Bio-Medical Waste Management</p> <p>Section Cutting</p> <p>Tissue processing for routine paraffin sections-</p> <p>Decalcification of Tissues, Staining of tissues - H&amp; E Staining</p>
2	Practical II-



	<p>Cytology Pathology Practical</p> <p>Morphology and Physiology of cell</p> <p>Cytology of Female genital Tract- Urinary Tract, Gastrointestinal Tract, Respiratory Tract, Effusions, Miscellaneous Fluids, Collection, Preservation.</p> <p>Fixation and Processing of various Cytological Specimen</p> <p>Preparation and Quality control of various stains and reagents used in cytology</p> <p>All routine and special Staining techniques in cytology</p> <p>FNAC, Immunocytochemistry, Flowcytometry, Automation in Cytology.</p>
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**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. PATHOLOGY PRACTICAL BOOK For Undergraduates, Jaypee, by Harsh Mohan Paperback 1e
- B. <http://medicalebooks-aslam.blogspot.in/search/label/pathology>

**MICROBIOLOGY-II – MBL12301P**

UNIT	CONTENTS
1.	<p><b>Microbiology Practical:</b></p> <p>Compound Microscope</p> <p>Demonstration and sterilization of equipments – Hot Air oven, Autoclave, Bacterial filters.</p> <p>Demonstration of commonly used culture media, Nutrient broth, Nutrient agar, Blood agar, Chocolate agar, Mac Conkey medium, LJ media, Robertson Cooked meat media, Potassium, Tellurite media with growth, Mac with LF &amp; NLF, NA with staph, Antibiotic susceptibility test.</p> <p>Demonstration of common serological tests – Widal, VRDL, ELISA, Grams staining, Acid Fast staining</p> <p>Stool exam for Helminthic ova</p> <p>Visit to hospital for demonstration of biomedical waste management</p> <p>Anaerobic culture methods.</p>
2.	<p><b>Parasitology Practical:</b></p> <p>Collection and transport of specimens for diagnosis of parasitic diseases</p> <p>Examination of faeces for parasite ova and cysts etc. by direct and concentration methods (salt floatation and formol-ether methods).</p> <p>Egg counting techniques for helminthes micrometry and mounting of slides</p> <p>Examination of blood for protozoa and helminthes by wet mount</p> <p>Thick and thin stained smears</p> <p>Examination of blood for Microfilariae including concentration techniques</p> <p>Examination of other specimens eg. Urine , CSF, Bone marrow etc. for parasites.</p> <p>Preparation &amp; performance of stains –Leishman, Giemsa, Lugol’s iodine, Micrometry.</p> <p>Identification of medically important adult worms</p> <p>Identification of common arthropods and other vectors viz. mosquito, Sandifly, tick, mites, Cyclops</p> <p>Preservation of parasites-mounting, Flexing, Staining etc.</p>
3.	<p><b>Immunology Practical:</b></p> <p>Collection of blood by venu puncture separation of serum and preservation of serum for short and long periods.</p> <p>Performances of serological tests, Bacterial slide agglutination, Widal, Pregnancy test,</p>

	ALSO, CRP, RF, Elisa, Skin tests. Demonstration of Casoni's test, MT test.
4.	<b>Virology Practical:</b> Preparation of glassware for tissue cultures (washing, sterilisation) Preparation of buffers like PBS, Hank's. Preparation of clinical specimens for isolation of viruses Collection & transport of specimens Serological tests-ELISA for HIV & HBsAg etc Chick Embryo techniques-inoculation and harvesting Handling of mice, rats and guinea pigs for collection of blood Molecular techniques in virology.
5.	<b>Mycology Practical:</b> KOH & LPCB Preparation, Staining Techniques, Culture of Fungi, Slide Culture Basic Identification techniques.

**LEARNING SOURCE:** Self Learning Materials

**ADDITIONAL READINGS:**

- A. Practical Microbiology by Vasanthakumari BI Publications Pvt Ltd, 2009
- B. [http://www.cuteri.eu/microbiologia/manuale\\_microbiologia\\_pratica.pdf](http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf)

**HOSPITAL TRAINING-III-TRN12301**