

Course Name: DMLT

Duration of Course: 2 Years

Eligibility: 10+2(PCB)

Lateral Entry: Candidate who has 10+2 + CMLT from a recognized University is eligible for 2nd Year in DMLT.

FIRST YEAR

CODE	SUBJECT	CREDIT
DMLT101	BASICS OF HUMAN ANATOMY	3
DMLT102	BASICS OF MEDICAL PHYSIOLOGY	3
DMLT103	PATHOLOGY	4
DMLT104	COMPUTER SKILLS	4
DMLT105	COMMUNICATION SKILLS	4
DMLT106	BASICS OF BIOCHEMISTRY	4
DMLT107	INTRODUCTION TO MICROBIOLOGY	4
DMLT108	MS-OFFICE	4

SECOND YEAR

CODE	SUBJECT	CREDIT
DMLT201	PARASITOLOGY	3
DMLT202	BACTERIOLOGY	3
DMLT203	BODY FLUIDS & STOOL EXAMINATION	4
DMLT204	CLINICAL LAB	4
DMLT205	HISTOPATHOLOGY	4
DMLT206	CYTOLOGY	4
DMLT207	DIAGNOSTIC BLOOD SUGAR & CHOLESTEROL	4
DMLT208	BIOCHEMISTRY TESTS	4

Detailed Syllabus

Semester: I

Course: DMLT

Subject: BASICS OF HUMAN ANATOMY (101)

Unit-I

Basic terminologies used in anatomy

Structure of cell, its components- Their structures and functions, movement of materials across plasma membrane

Unit-II

Elementary tissues of human body-epithelial, connective, muscular, and nervous tissues-their subtypes and characteristics

The Blood-composition and functions of blood, RBC, WBC, Platelets, Haemopoiesis, blood groups, mechanism of Clotting, anemia, disorders of blood

Unit-III

Cardiovascular system- Blood vessels-anatomy of heart, conducting elements of heart, cardiac cycle and heart sounds, blood vessels and circulation (pulmonary coronary, systemic and portal), ECG, Blood pressure (Maintenance and regulation), disorders of cardiovascular system

Lymphatic system- Lymph (Formation, composition, functions, circulation), lymph node (structure and functions), spleen and its functions, disorders of lymphatic system

Unit-IV

Respiratory system- Anatomy of respiratory organs and their functions, mechanism and regulation of respiration, physiology of respiration, transport of gases, respiratory volumes, methods of artificial respiration, and disorders of respiratory system

Detailed Syllabus

Semester-I

Course: DMLT

Subject: **BASICS OF MEDICAL PHYSIOLOGY (102)**

Unit-I

General information:- The cell, membrane potential, some common terms used in physiology.
Blood:- Red blood corpuscles, hemoglobin, the leucocytes, immunity, origin and function of lymphocytes, reticuloendothelial system, the platelets, homeostasis, coagulation of blood, the plasma proteins, blood groups.

Unit-II

Digestive system:- introduction to digestive system. Elementary functional anatomical considerations, the salivary glands, the stomach and its secretion, pancreas, the bile, the small intestine, movement of the alimentary tract, gastrointestinal hormones, apud cells.

Unit-III

Urinary system- Anatomy and physiology of parts of urinary system, structure of nephron, formation of urine, Renin-angiotensin system, Balance (acid base, electrolyte and water), renal clearance tests and physiology of micturition, disorders of urinary system
Endocrine system- Anatomy and physiology of hormones of pituitary gland, adrenal gland, parathyroid gland, pancreas, gonads (testis and ovary), disorders of endocrine system

Unit-IV

Reproductive system- Anatomy and physiology of various parts of male and female reproductive systems, physiology of menstruation, spermatogenesis and oogenesis, disorders of reproductive system

Nervous system- Classification of nervous system, Anatomy and physiology of parts of brain (cerebellum, pons, medulla oblongata, thalamus, hypothalamus, and functional areas of cerebrum), extra pyramidal system, limbic system, Spinal cord (Structure and reflexes), cranial nerves (Names and functions), Autonomous nervous system (sympathetic and parasympathetic), fundamentals of neurotransmitters, process of neuroconduction and neurotransmission. disorders of nervous system

Detailed Syllabus

Semester-I

Course: DMLT

Subject: PATHOLOGY (103)

Unit-I

The Cell in Health and Disease:- Introduction to Pathology, Cellular Structure and Metabolism, Etiology and Pathogenesis of Disease, Intracellular Accumulations and Disorders of Metabolism, Amyloidosis, Degenerations and Cell Death.

Alimentary System

Tongue - Ulcer, Tumour, Oral Cavity - Thrush, Tumour, Oesophagus- Inflammatory Disease, Tumour, Stomach- Inflammatory Disease, Auto Immune Disease

Unit-II

Inflammation and Healing, Immunity and Hypersensitivity, Infection and infestation:- Inflammation- Acute and Chronic, Granulomatous Inflammation, Healing, immunity and Hypersensitivity, Infection and Infestation. - Intestine Small and Large - Ulcers, Infection, - Tumour, Malabsorption.
- Appendix - Inflammatory Disease

Unit-III

Fluid and Haemodynamic Derangements:- Derangements of Body Fluids and Electrolytes, Haemodynamic Disorders due to Deranged Blood Volume, Haemodynamic Disorders of Obstructive Nature, Ischaemia and Infarction. - Liver - Inflammatory Disease Tumours Cirrhosis Jaundice .
- Gall Bladder - Inflammatory Disease Tumour
- Pancreas - Inflammatory Disease Tumour

Unit-IV

Growth Disorders and Neoplasia:- Adaptive Disorders of Growth, General Aspects of Neoplasia, Etiology and pathogenesis of Neoplasia, Clinical Aspects of Neoplasia, Common Specific Tumours. - Central Nervous Disease - Common Disorders - Respiratory Disorders - Common Disease
- Kidneys - Common Disorders - Tumours
- Urodynamics

Detailed Syllabus

Semester: I

Course: DMLT

Subject: COMPUTER SKILLS (104)

Unit-I

Hardware & Software: CPU, RAM, SSD, Operating Systems, System Softwares, Application Software. Inside Computers. Computer Systems, Internet Explorer & the World wide Web Generations of Computer, Classification of Computer

Unit-II

Input-Output devices: Monitor, Keyboard, Mouse, System Unit, Printer, Scanner. Storage devices : Floppy disk, Hard disk, Cartridge tape, CD-ROM, Search Engines, Web Portals. Shopping Online

Unit-III

Printers : Dot-Matrix, Inkjet, Laserjet, Colour printer, High speed printer, Label printer, Plotters. PROGRAMMING LANGUAGE:-Compiler, Assembly Language, Machine Language, Email: Compose and send a message. Reply to a message, Working with email attachments

Unit-IV

Graphical user interface: Windows 3x, Program manager, Main & accessories program groups, Multitasking, Windows Help: Search, Index. Help Online

Detailed Syllabus

Semester: I

Course: DMLT

Subject: COMMUNICATION SKILLS (105)

Unit-I

Basic Skills: - Listening, Speaking, Reading and Writing. Comprehension: - Reading Comprehension, Passages, Poems.

Unit-II

Listening Comprehension: - Talks, Reports, Poems

Writing Skills: - Paragraph Writing, Composition Writing, Report Writing, Application & Letter Writing

Unit-III

Grammar: - Simple, Compound and complex sentences, Co-ordinate clause (with, but or either-or, Neither-Nor otherwise or else), Subordinate clauses-noun clauses-as subjects object and complement: Relative Clauses (restrictive and non-restrictive clauses). Adverb clauses (open and hypothetical, Comparative Clauses

Unit-IV

Simple present, progressive and present perfect, simple past, progressive and past perfect, indication of futurity, the passive (Sample present and past, present and past perfect and 'to' infinitive structure), Reported Speech: - (I) Declarative sentences, (ii) Imperatives (iii) Interrogatives –question, Yes/No Questions, Exclamation sentences, Modals (will, shall, should, would, ought to, have to/have got to, can, could, me-might and need), Verb structures (infinitives and gerundial)

Detailed Syllabus

Semester: I

Course: DMLT

Subject: BASICS OF BIOCHEMISTRY (106)

Unit-I

Preliminary Techniques in Biochemistry - Animal models - Choice of animals, Types of Studies, Mutant Organisms, Cultured Cells, Plant as models.

Cell Fractionation Techniques - Cell lysis, differential and density gradient centrifugation, Salting in, Salting out, Dialysis, Ultrafiltration.

Chromatographic Techniques - Principles and Applications of Paper, TLC, Adsorption, Ion exchanges, Gel filtration, Affinity, GLC, Chromato focusing, HPLC, FPLC.

Unit-II

Electrophoretic Techniques - Polyacrylamide gel electrophoresis, SDS-PAGE, Agarose gel Electrophoresis Separation of Proteins, Lipoproteins, Nucleic acids, Visualizing separated components - staining, Fluorescent techniques Isoelectric focusing, pulsed field electrophoresis, High voltage electrophoresis, Capillary Electrophoresis, Isotachopheresis.

Ultra Centrifugation - Construction of preparative and analytical ultra centrifuge, Svedberg's constant, Sedimentation velocity and Sedimentation equilibrium Schlieren optics.

Unit-III

Isotopic Tracers - Heavy isotopes and radio isotopes theory and construction of mass spectrometer. Ionization, fragmentation, m/e, Time of flight, MALDI and ESI.

Radioisotopes in Biology - ^3H , ^{14}C , ^{32}P , ^{131}I , ^{35}S , concept of half life, decay constant, detection and quantitation - GM counter and scintillation counter, solid and liquid scintillation. Specific activity, Carrier free isotope, Isotope dilution techniques autoradiography.

Synthesis of Isotopically labeled glucose (Glucose 1- ^{14}C and uniformly labeled glucose) acetate (1- ^{14}C and 2- ^{14}C) Leucine, ATP ($^3\text{-}^{32}\text{P}$ and $^3\text{-}^{32}\text{P}$). Determination of position of labeling

Unit-IV

Spectroscopic Techniques - Colourimetry, Spectrophotometry, Fluorimetry. Principles - Beer-Lambert's Law, Limitation, Extinction Coefficient. Application.

X-ray Crystallography - Protein crystals, Bragg's law, unit cell, Isomorphous replacement, Fiber pattern of DNA

Physical methods of determining size shape and structure of molecules :-

Magnetic Resonance - NMR and ESR - Principles and Applications.

Vibration Spectra - IR and Raman - Principles and Applications.

Light Scattering - Determination of size and shape of macromolecules.

Polarized Light - Plane and circularly polarized light. CD, Applications of CD.

Detailed Syllabus

Semester: I

Course: DMLT

Subject: INTRODUCTION OF MICROBIOLOGY (107)

UNIT – I History of Microbiology and Microscopy

Meaning, definition and history of Microbiology, Importance and applications of Microbiology. Principles of microscopy – bright field, dark field, phase-contrast, fluorescent and electron microscopy (SEM and TEM). Ocular and stage micrometers. Size determination of microorganisms. Principles and types of stains - Simple stain, differential stain, negative stain, structural stains - spore, capsule, flagella. hanging-drop method.

UNIT – II Microbiological Techniques

Sterilization and disinfection techniques, Principles and methods of sterilization., Physical methods - autoclave, hot-air oven, pressure cooker, laminar air flow, filter sterilization., Radiation methods – UV rays, gamma rays, ultrasonic methods., Chemical methods - Use of alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites. Phenol coefficient., Isolation of pure culture techniques - Enrichment culturing, dilution-plating, streak- plate, spread-plate and micromanipulator., Preservation of microbial cultures - sub culturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature.

UNIT – III Biology of Prokaryotic and Eukaryotic Microorganisms

Outline classification of living organisms: Hackel, Whittaker And Carl Woese systems., Place of microorganisms in the living world., Differentiation of prokaryotes and eukaryotes., Prokaryotes - General characteristics of bacteria, archaeobacteria, rickettsias, mycoplasmas, cyanobacteria and actinomycetes., Outline classification for bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology (up to order level Structure and multiplication of lambda bacteriophage. Eukaryotes - General characteristics and classification (up to the order level) of eukaryotic microorganisms - Protozoa, microalgae, molds and yeasts.

UNIT – IV Biomolecules

Biomolecules of microorganisms., Outline classification and general characteristics of carbohydrates (monosaccharide, disaccharides and polysaccharides), General characteristics of amino acids and proteins. Structure of nitrogenous bases, nucleotides, nucleic acids. Fatty acids (saturated and unsaturated) and lipids (sphingolipids, sterols and phospholipids). hydrogen ion concentration in biological fluids, pH measurement. Types of buffers and their use in biological reactions. Principle and application of colorimeter and chromatography (paper And Thin -layer).

Detailed Syllabus

Semester: I

Course: DMLT

Subject: MS-OFFICE (108)

Unit-I

MS Word : Creating documents, Formatting, Auto text, Auto correct, Tables, Page setup, Printing Working with Word Basics, Creating and Editing Business Letters , Creating a Memorandum and a Press Release, Creating a Simple Report

Unit-II

Object linking & embedding, Spell check, Thesaurus, Mail merge, Word art, Adding Clip Art, Sound, and Animation setup, Page setup, Printing, Editing, Viewing.

Unit-III

MS Excel : Creating workbooks & worksheets, Formulas & functions, Linking workbooks & worksheets, Cell references, Formatting, Creating charts, Data lists, Printing Worksheets, Working with Formulas and Functions, Formatting the Contents of Cells, Changing the Appearance of Worksheets, Discovering the Magic of Excel Charting

Unit-IV

MS Power Point : Creating slides with different layouts and templates, Inserting charts, Tables, Organisation charts, Pictures, Running a screen show, Working with Tables Creating and Delivering a Presentation, Designing the Presentation,

Detailed Syllabus

Semester-II

Course: DMLT

Subject: PARASITOLOGY (201)

Unit-I

PROTOZOA:-Classification, Parasitism in Perspective: Why study parasites?

kinds of parasites & kinds of host, Protozoa: Phylum Sarcomastigophora, Protozoa: Phylum Apicomplexa , Protozoa: Phylum Ciliophora, Phylum Platyhelminthes, digenetic trematodes

Unit-II

Malarial parasite; Eishmania, Platyhelminthes: monogeneans, Platyhelminthes: cestodes, Nematodes: form, function, and reproduction, Nematodes: life cycles; Trichurids, Strongyloids, Nematodes: Do you like sushi? Oxyurida, Ascaroids, Filaroids

Unit-III

Amoeba ; Giardia ; Trichomona, Acanthocephalans: form, function, reproduction, and humans, Parasitism in other metazoan groups, Parasite Populations: internal factors affecting population structure, Parasite Biogeography: factors affecting geographical distribution

Unit-IV

Parasites as biological markers

Evolution of host–parasite associations, Fasciola hepatica-Fasciola gigantic, Clonorchis sinensis, Microspora, Hemosomatic Protozoa, Free living Amoeba

Detailed Syllabus

Semester-II

Course: DMLT

Subject: BACTERIOLOGY (202)

Unit-I

Culturing environmental samples (air-exposure plates and simple swabbing).

Gaining proficiency with the microscope. Simple and differential staining methods including gram, capsule, acid-fast and endospore stains.

Basic pure culture procedures including transfer techniques and streak plates. Quantitative Microbiology I: The plate count method. Microbial count of hamburger – “total” and gram-negative, Introduction to nutritional requirements and bacteriological media. Requirements of certain bacteria for growth factors. Alteration of bacterial characteristics due to changes in the environment.

Unit-II

Basic Catabolism I: Aerobic respiration and fermentation and their role in the test for “oxygen relationship” as per the Bergey’s Manual definitions; correlation of oxygen relationship designations with related physiological processes in bacteria. A study of the bacterial growth curve with determination of the growth rate of an E. coli culture Microscopic and cultural methods for the determination of bacterial motility. Quantitative Microbiology II: The Most Probable Number (MPN) method. Bacteriological examination of water: Quantitation of “total” bacteria; enrichment, detection, isolation and identification of coliforms.

Unit-III

Basic Catabolism II: Anaerobic respiration as demonstrated by the test for nitrate reduction. Characterization, Differentiation and Identification of Bacteria: Comparative morphology and physiology of selected species and an introduction to base sequencing and phylogenetic trees. Detection and isolation of mutants and recombinants, Quantitation of bacteriophages and use of bacteriophages to assist bacterial identification. Determination of susceptibility of bacteria to various antibiotics. Principles of enrichment and isolation of bacteria from natural sources. Consideration of microbial cycling of elements – particularly N, C, S and O. Isolation of antibiotic-producing, endospore-forming and nitrogen-fixing bacteria from soil. Isolation of anoxygenic photosynthetic bacteria from water samples.

Unit-IV

Basic Catabolism III: Anoxygenic phototrophy with a comparison to oxygenic phototrophy. Brief study of Staphylococcus, Streptococcus and Neisseria including their isolation and the tests for hemolysis, coagulase and oxidase, Isolation and identification of enteric bacteria including the use of serology in the identification of Salmonella. (Clinical procedures are emphasized along with the use of correct and current taxonomic terminology.), Basic principles concerning pH-based differential media and the formulation of such media to distinguish certain physiological types of bacteria.

Detailed Syllabus

Semester-II

Course: DMLT

Subject: BODY FLUIDS AND STOOL EXAMINATION (203)

Unit-I

Urine analysis :-Methods of collections, routine urine examination ,microscopic examination , evaluation of renal function tests.

Unit-II

BODY FLUIDS :- Collection of c.s; physical examination ; chemical examination ; cell count ; bacteriological examination ; differential diagnosis .

Unit-III

Stool examination:- Normal appearance and composition ; collection of specimen

Unit-IV

Physical examination ; microscopic examination ; protozoa ; Helminthic ova

Detailed Syllabus

Semester-II

Course: DMLT

Subject: CLINICAL LAB (204)

Detailed Syllabus

Semester-II

Course: DMLT

Subject: HISTOPATHOLOGY (205)

Unit-I

Introduction to histology and histopathology, techniques in histopathology, Types of Biopsy, Registration, labeling and recording of biopsy reports, Identification and labeling of specimens, fixation of specimens before grossing ; grossing of specimens

Unit-II

Basic principles of grossing in histopathology , Fixatives Various types and their importance, Fixation including microwave, Freeze drying technique, decalcification, frozen sections, Introduction to autopsy techniques, Dispatch of autopsy specimen for Histopathological Examination, FNAC

Unit-III

Processing of tissue specimens ; Embedding of tissue specimen ; cutting of tissue specimen, Tissue histology processing include Micro wave, Microtomy, Microscopy (light, polarizing, phase contrast), Micrometry, In situ hybridization and FISH techniques, Elementary cytogenetics, Museum specimen preservation, Method cytology Processing (Millipore, Cytospin), Embalming

Unit-IV

Routine staining of procedures ; Staining, H & E, PAS, Van Geison, Verhoeff's, Reticulin, Masson's Trichrome stain, Grocott, Congo red, AFB (for Tuberculosis & Lepae) Gram's stain Stains for fungi, glycogen, melanin, inclusion bodies, neurons and neuroglia Dehydration, clearing and decalcification, Impregnation and embedding of paraffin and sliding, Papanicolaou staining, Immunohistochemistry

Detailed Syllabus

Semester-II

Course: DMLT

Subject: Cytology (206)

Unit-I

Introduction, Fine needle aspiration cytology, Papanicolou method for cytologic smears
Cytology: General properties of living organisms; chemistry of the cells; cellular membranes; cytoskeleton

Unit-II

Endoplasmic reticulum; Golgi body; lysosomes; nuclear envelope; chromatin and chromosomes; mitosis; meiosis. Outline of Embryology: Gametogenesis; reproductive cycle; fertilisation; cleavage; a model of gastrulation

Unit-III

Plant cell, structure and function. Prokaryotic and Eukaryotic cells. Cell wall, structure and chemistry. Functions of cell wall. Plasma membrane - structure, chemistry and function.

Cell Organelles: Structure, function and origin of the following:

Endoplasmic reticulum

Golgi complex

Lysosomes

Mitochondria

Plastids

Ribosomes

Unit - IV

Nucleus -- Structure and function.

Nucleolus - Structure and function.

Chromosome - Structure and function.

Eucbromatin and heterochromatin.

Giant chromosomes, polytene and lampbrush. Nucleic acids.

Molecular structure and function of DNA and RNA. Replication.

Cell inclusions (non-living)

Cell divisions: Mitosis and Meiosis.
(Note: Structure includes ultra structure).

Detailed Syllabus

Semester-II

Course: DMLT

Subject: DIAGNOSTIC BLOOD SUGAR & CHOLESTEROL (207)

Unit-I

Estimation of blood sugar and cholesterol

Unit-II

Estimation of blood sugar

Unit-III

Glucose Tolerance test

Unit-IV

Estimation of serum cholesterol

Detailed Syllabus

Semester-II

Course: DMLT

Subject: BIOCHEMICAL TESTS (208)

Unit-I

Tests to Distinguish between aerobic and anaerobic breakdown of carbohydrate

Unit-II

Fermentation reactions ; tests for specific breakdown products

Unit-III

Ability to use a specific substrate ; tests for specific breakdown products and amino acids

Unit-IV

Tests for production of enzymes