



SYLLABUS OF DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

Anatomy & Physiology

1. **Introduction:-** Definition- Anatomy, Physiology ,Basic medical terminology(Body cavities, planes, general organization of the body).
2. **Cell & Tissue:-** Basic organization of cell- Mitochondria, Golgibody, Ribosomes, Endoplasmic reticulum, Nucleus, Tissues , Types of tissues and their functions.
3. **Skeletal system:-** Classification of Bones, Upper extremity, Lower extremity, Vertebral column, Skull Bones, Ribs Synovial joints, Joint diseases.
4. **Cardiovascular System-** Blood, Heart(Structure and functions), Cardiac Cycle, Cardiac output, Blood pressure, Heart sound, Blood Vessels, Circulation (Pulmonary & Systemic)
5. **Respiratory System:-** Nose, Pharynx, Larynx Trachea, Bronchi, Lungs, Function of Respiratory tract, tidal volume, residual volume, Reserve Volume.
6. **Digestive System:-** Mouth, Oesophagus, Salivary glands, Stomach, Small Intestine, Large Intestine, Pancreas, Liver, Biliary system, General Principle of Digestion.
7. **Excretory System:-** Kidney, Function & internal Structure and formation of Urine, ,Nephron- Structure and functions, Ureter, Urinary Bladder, Urethra, Micturation.
8. **Reproductive System:-** i) Male reproductive System- Testes, Scrotum, penis, glands
ii) Female reproductive System- Ovaries, Fallopien tubes, Vagina, Breast , Female reproductive cycle , Menstruation , Fertilization.
9. **Endocrine glands:-**Types of glands, Types of endocrine glands, Pituitary gland, Pineal gland, Thyroid gland, Adrenal gland, Parathyroid gland, Pancreas, Gonads.
10. **Nervous System:-** Nerve cell structure and function, Central nervous system, Peripheral nervous system, Automatic nervous system, Brain-parts and functions, Function of CSF, spinal cord, nerves.
11. **Integumentary system-** Skin(Introduction, Structure, Function), hair, nails, exocrine glands.
12. **Lymphatic System:-** Introduction, Structure Function, location, spleen



BIOCHEMISTRY & ADVANCED TECHNIQUES

- 1. Carbohydrates** (8 hrs)
Dietary Sources, digestion & absorption, basic metabolism, Regulation of blood glucose & its importance, Diabetes Mellitus, Glucose tolerance test, Glycosylated Hb, Other parameters and related disorders.
- 2. Proteins** (8 hrs)
Dietary sources, digestion & absorption, fate of amino acids, nitrogen equilibrium, Formation and detoxification of ammonia, formation of urea, formation of non protein nitrogenous products e.g. uric acid, creatinine, Disorders related to protein and nitrogen metabolism.
- 3. Lipids** (6 hrs)
Dietary sources, digestion & absorption, basic metabolism, Lipid profile (cholesterol, triglyceride, lipoproteins, phospholipids) and its significance in various disorders.
- 4. Enzymes** (5 hrs)
Classification, properties, factors affecting enzyme activity, iso-enzymes and coenzymes. Explain Therapeutic, diagnostic and analytical uses of enzymes with normal values of serum enzymes.
- 5. Hormones** (5 hrs)
Chemical nature and biochemical functions.
- 6. pH and buffers** (3 hrs)
Regulation of blood pH, Henderson Hasselbach equation, renal, respiratory and buffer system.
- 7. Organ profile Test** (8 hrs)
Liver function test, Kidney function test, Thyroid function test, Cardiac function test, Pancreas function test, Hypertension profile, Diabetic profile, Gastric function test.
- 8. Instrumentation** (6 hrs)
Balances, Centrifuges, pH meter, Colorimeter, Spectrophotometer, Fluorimeter, Flame-photometer, Ion selective electrodes, Urinometer; General Principles, Care and Cleaning of Glasswares ; Rapid diagnostic technique - Glucometer, Cholesterol strip.
- 9. Molecular diagnostic techniques** (8hrs)
Electrophoretic techniques, Immunological Methods, Chromatographic technique, Radio-isotopic Technique, Automation in Bio-chemistry – wet and dry chemistry, Polymerase Chain Reaction (PCR), Southern hybridisation analysis, Dot blot hybridisation analysis.
- 10. Preparation of Reagents** (4 hrs)
Acids, bases and salts, pH indicators - pH meter - pH measurement, Solutions: Molar, Normal, Buffer, Percent, Saturated, Standard solutions, Osmosis, osmotic pressure, diffusion, hypotonic, hypertonic and isotonic solutions



Communication and Personality Development

- **Soft Skills and Communication** (5 hrs)
 - Introduction
 - Process of Communication
 - Types of Communication
 - Interaction with Patients and their relatives in health care
 - Interaction with peers/ colleagues

- **Grammar** (10 hrs)
 - Sentences
 - Articles
 - Parts of speech(Noun, Pronoun, Verb, Adverb, Preposition, Adjective, conjunctions, Interjection)

- **Importance of : Team, Goal, Time** (4 hrs)
 - - Via:-** a) Presentation
 - b) Group Discussion
 - c) Role Play

- **Core Skills (Writing Skills)** (6 hrs)
 - Formats and Style of writing
 - Formal and Informal Letter
 - Applications
 - Presentations

- **Interviews** (6 hrs)
 - Techniques of handling interviews
 - Group discussion
 - Resume writing



Haematology & Advanced techniques

1. **Haematology:-** Composition of blood, formation of blood & function of blood, collection method, difference between capillary & venous sample Anticoagulant different types of anticoagulant. **(8 hrs)**
2. **Haemoglobin:-** Hemoglobin, Hemoglobin types(HbA, HbA2, HbF) explain different types of method(Physical, Chemical, Gasometric & Colorimetric method) with their equipment and reporting, Normal values and clinical significance. **(10 hrs)**
3. **Immunoematology:-** Blood group antigen and their inheritance ABo blood group system(Antigens & Antibodies), Rh blood group system, Rh antibodies, and Rh inheritance other blood group System- MNS blood group kell, Bombay blood group preparation and preservation of grouping antisera. **(10 hrs)**
4. **Blood Banking:-** Blood transfusion, selection of Donor, screening test of Donor preparation and properties of anticoagulant solution, method of collection Titration of antibodies(complete & incomplete).Cross Matching direct and indirect test **(8 hrs)**
5. **Transfusion of Cell Component:-** Explain cell preparation, Techniques of transfusion of various component of blood, Serum immunoglobulin, Significance in blood banking organization, operation, administration, maintenance of records, government regulation.(FDA)
6. **Transfusion Reaction:-** Hemolytic disease of new born (HDN),Exchange transfusion, Transfusion transmitted disease.
7. **Instrumentation:-** Blood bank equipment, cleaning and assembling of blood transfusion apparatus, equipment used in hemoglobin estimation. Aware of purpose, method and equipment of following advanced techniques of haematology and blood banking. **(4 hrs)**
8. **Automation in haematology:-** Automatic vein puncture and evacuated tubes, cell counter & coagulometer, cell separation and cell component plasma pharesis
9. **Quality Control:-** Quality control management, IQL, EQL programme. **(6 hrs)**



Histopathology & Cytopathology

Introduction – Tissue, Histology, Histopathology, Histotechnology, Histochemistry, immunohistochemistry.

Instrumentation- Automatic tissue processor, parafinizer, microtome, tissue flotation water bath, slide warmer, microscope (principle, types, parts, uses, care and maintenance)

Specimen collection and various types of specimens.

Basic steps of tissue processing-

1. Logging (receiving and labeling)
2. Fixing/ Fixation and various types of fixative.
3. Decalcification and various types of decalcifying agents.
4. Grossing and labeling
5. Dehydration and various types of dehydrating solution.
6. Clearing
7. Infiltration and Impregnation.
8. Embedding and various types of Embedding media
9. Microtomy and various types of section cutting (frozen section, cryostat method.)
10. Staining (routine and special) H&E stain
11. Mounting and various types of mounting media
12. Microscopy
13. Filing- Blocks and slides

Cytopathology

Introduction – Cell, cytology, Cytopathology, cytotechnology

Sample collection and various types of cytological sample (Body fluids, FNAC)

Fixation of cytological smear and various types of fixative

Staining (routine and special)PAP, Giemsa, cresyl violet

Mounting and mounting media

Microscopy

Filing- slides



Microbiology

1. **General Microbiology** :- (10 hrs)
 - Historical Introduction, Microscopy and Morphology of Bacteria, Growth and Nutrition of Bacteria, Sterilization & Disinfection, Culture Media, Culture Methods.
2. **Immunology** :-
 - Immunity, Antigen, Antibody, Complement System, Ag-Ab Reactions.
3. **Systemic Bacteriology** :- (10 hrs)
 - Morphology, Pathogenicity and Laboratory Diagnosis of: Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium, E.coli, Salmonella, Mycobacterium tuberculosis and M.leprae
4. **Virology** :- (5 hrs)
 - Cultivation and Multiplication of viruses, Bacteriophages.
 - Morphology, Pathogenicity and Laboratory Diagnosis of HIV/AIDS, Hepatitis
5. **Mycology** :- (2 hrs)
 - Medical Mycology
6. **Clinical Microbiology** :- (3 hrs)
 - Normal Microbial flora of the Human Body
 - Antimicrobial Sensitivity Test
 - Hospital Acquired Infection
7. **Parasitology** :- (5 hrs.)
 - Morphology, Life cycle and General laboratory diagnosis of parasites.