

COURSE NAME: MASTER OF MEDICAL LAB TECHNOLOGY

YEAR I

Course Code	Course Title
BCH16110	Endocrinology, Metabolic and Nutritional Biochemistry
MBL16115	Advanced Microbiology
BCH16111	Analytical and Physical Biochemistry
BBN16102	Blood Banking and Immunopathology
MLT16103	Lab Management and Techniques
PAT16103	Advanced Hematology and Immuno-Hematology
MBL16116	Immunology and Molecular Biology
MBL16115P	Advanced Microbiology (P)
BCH16111P	Analytical and Physical Biochemistry (P)
BBN16102P	Blood Banking and Immunopathology (P)

YEAR II

Course Code	Course Title
BOX16203	Biostatistics and Epidemiology
MBL16213	Systemic Bacteriology and Diagnostic Microbiology
BCH16210	Clinical Biochemistry
PAT16201	Histopathology and Cytopathology
PAT16202	Clinical Pathology and Cytogenetics
MBL16214	Medical Parasitology, Mycology and Virology
MBL16214P	Medical Parasitology, Mycology and Virology (P)
MBL16213P	Systemic Bacteriology and Diagnostic Microbiology (P)
BCH16210P	Clinical Biochemistry (P)
PAT16202P	Clinical Pathology and Cytogenetics (P)
DSR16201	Dissertation

YEAR I**ENDOCRINOLOGY, METABOLIC AND NUTRITIONAL
BIOCHEMISTRY – BCH16110**

UNIT	CONTENT
1	General Concepts of Endocrinology: The endocrine system; hormones- chemical nature; classification; hormonal action- receptors; hormone receptor interaction; regulation of gene expression by hormones; second messengers (camp, GMP, Ca++) Protein kinase cascade; Concepts of hormones assay.
2	Pathology in Endocrine Systems: Abnormal Hormone Activity; Endocrine organ hypofunction; Endocrine organ hyperfunction; Abnormality in hormone transport or metabolism; Abnormal hormone receptor binding and/or signal transduction; Neoplasms; Iatrogenic; Assessment of endocrine diseases; Endocrinal imaging.
3	Hypothalamus and Pituitary Gland: Anatomy; chemistry; functions; regulation; Diseases related to the hormones of these glands; Assessment of anterior and posterior pituitary.
4	Thyroid Gland: Anatomy; chemistry; synthesis; functions; regulation; thyroid function test in various abnormal conditions; parathyroid – anatomy; chemistry; synthesis; functions; regulations; diseases of parathyroid glands; Hormones involved in calcium and phosphate metabolism; Diseases related to its metabolism; Calcium chemistry and functions.
5	Adrenal Cortex and Medulla: Anatomy; chemistry; synthesis; metabolic effects; pathophysiology of the adrenal cortex; Assessment of adrenal functions; Gonadal hormones – anatomy, chemistry; functions; regulations and diseases related to these glands; Endocrinology of male and female infertility; pregnancy and lactation.
6	Gastrointestinal and Pancreatic Hormones: Chemistry; synthesis; metabolic effects; regulation; diseases related to the hormones of these glands; Detection of anomalies.
7	Introduction to Nutritional Biochemistry: Overview of course structure and assessment; General principles in nutritional science.
8	Nutrition: Nutritional requirements of carbohydrates; proteins and lipids; Deficiency states of carbohydrates, proteins and lipid; Minerals and their role in nutrition; RDA, Nutritional requirements of vitamins (fat and water soluble); Structure, functions, deficiency states, dietary source; Nutritional requirements of macro and microelements-functions, deficiency states, dietary source, RDA.
9	Dietary Fiber: Definition of dietary fibre; Cellulose, glucans, pectins, hemicelluloses, lignin, fructans; Resistant starch (RS) as dietary fibre; Examples of the physiological and metabolic effects of dietary fibre; Dietary fibre in disease prevention; Recommended intakes.
10	Nitrogen Fixation: Mechanism of nitrogen fixation; Symbiotic nitrogen fixation; Non-symbiotic nitrogen fixation; Genetic Basis of Nitrogen Fixation.
11	Fermentation: Types of fermentation; Pathway of fermentation; Anaerobic fermentation; Enzymes as fermentation products.
12	Nutrition in Health and Disease: Balanced diet-Regulations of food intake and energy storage; Disorder of nutrition-Malnutrition, malabsorption, obesity, starvation, deficiency diseases.
13	Alcohol Metabolism: Alcohol dehydrogenase pathway; Microsomal ethanol oxidising system (MEOS); Dietary carbohydrates; Classification of dietary carbohydrates; The free sugars: Monosaccharide biochemistry.
14	Metabolism During the Fed-Fast Cycle: Discussion over fed-fast cycle; The central role of the liver in the metabolism of dietary macronutrients; Metabolism during the fed state; The postabsorptive state and the role of stored liver and muscle glycogen; Fasting and the role of

	skeletal protein; Starvation and the role of triglycerides and ketones; Catabolism of vital protein.
15	Interrelationship: Metabolic interrelationship between adipose tissue, liver & extra hepatic tissues; Clinical Importance; Key Junction Glucose – 6 – Phosphate, Pyruvate & Acetyl-Co-A; Unique metabolic profile of various organs.
16	Electron Transport & Oxidative Phosphorylation: Components of Electron Transport Chain; Respiratory Chain; Energy Coupling hypothesis; Proton- Gradient generation; Mechanism of ATP synthesis; Uncoupling of Oxidative Phosphorylation.
17	Metabolism of Purines & Pyrimidines: Purine Biosynthesis - Formation of PRPP, Biosynthesis of Inosine-mono Phosphate, Purine Nucleotide inter conversion, Regulation of Purine biosynthesis; Pyrimidine Biosynthesis - Assembling of Pyrimidine Nucleus, Regulation of Pyrimidine Biosynthesis, Salvage Pathway for Purine & Pyrimidine Biosynthesis, Related Disorders.
18	Glycogen Storage Diseases & Galactosuria: Introduction; Different types of Diseases - Pompe's Disease; Cori's Disease; McArdle's Disease; Andersen's Disease; Hers' Disease; Taruis Disease; Galactosuria.
19	Intrinsic Disorders of Red Cells, Haemoglobin and Porphyrins Sphingolipidases: Disorders of Red Cells - Hemolytic Anemia, Sickle Cell Anemia, Thalassaemia; Disorders of Hemoglobin - Haemoglobinuria, Other Haemoglobinopathies; Disorders of Porphyrins – Introduction; Different types of Porphyria.
20	Aminoaciduria: Definition; Types of Aminoaciduria; Overflow Aminoaciduria; Renal Aminoaciduria.
21	Gout & Genetic Defects in Urate Metabolism: Introduction; Types of Gout – Primary, Secondary; Treatment; X-Linked Disorder.

ADVANCED MICROBIOLOGY – MBL16115

UNIT	CONTENT
1.	Introduction to Microbiology: History & scope of microbiology, safety methods in microbiology Laboratory; First aid in microbiology laboratory; Universal safety precautions; Safety cabinets; Common glassware for microbiology and its cleaning and sterilization; Disposal of waste materials in microbiology.
2.	Sterilization and Disinfection: Physical methods- Heat (Autoclaves, hot air oven), Filtration, Radiation; Chemical methods- Disinfectants, Antiseptics, Testing of disinfectants; Disinfection of thermo labile equipments; Sporicidal agents; Mycobacterial disinfection;

MASTER OF MEDICAL LAB. TECHNOLOGY-MMLT

	Quality control in sterilization.
3.	Microscope: Principle; Methods of safe working; Different parts; Preparation of smears for examination; Applications of following microscopes –Bright field, dark ground, phase contrast, differential interference contrast, fluorescent, electron (scanning, transmission (STEM), polarizing, tunneling and confocal; Micrometry.
4.	Bacterial Morphology: Ultra structure of bacterial cell, cell wall, capsule, flagella, fimbriae, bacterial spores, cytoplasmic inclusions; Morphologic changes during growth; Classification of bacteria- Definitions, Criteria for classification of bacteria, Identification & classification system, Description of the major categories & Groups of bacteria; Sub typing & its application.
5.	Staining Methods for Bacteria: Principles; Preparation of stains and reagents; Preparation of smears; Modification of following staining methods- Simple staining, Differential staining (Gram staining, AFB staining), Negative staining, Fluorochrome staining, Staining of Volutin granules, Staining of spirochetes, Spore staining, Capsular staining, Flagellar staining.
6.	General Bacteriology: Classification of Medically important Bacteria; Growth, survival & death of microorganisms- Survival of microorganisms in the natural environment, Meaning of growth, Exponential growth, Growth curve, Maintenance of cells in the exponential phase, Definition & measurement of death; Cultivation of microorganism- Requirements for growth, Sources of metabolic energy, Nutrition, Environmental factors affecting growth, Cultivation methods.
7.	Bacterial Metabolism: Role of metabolism in Biosynthesis & growth; Focal metabolites and their interconversion; Assimilatory Pathways; Biosynthetic Pathways; Regulation of Metabolic Pathways.
8.	Bacterial Genetics: Bacterial genome; Extra chromosomal genome; Phenotypic and genotypic variations; Regulation and expression of gene activity; Genetic transfer in bacteria; Hfr strains; R factor; Conjugation in Gram positive and Gram negative bacteria; Bacteria in genetic engineering; Mutation & gene rearrangement.
9.	Culture Media: Classification of culture Media; Preparation of Culture Media; Quality Control of Culture Media; Inoculation; Incubation & purification methods in bacteriology; Quantitation of bacterial growth; Preservation of bacteria.
10.	Biochemical Tests for Identification: Principle, Media & Reagents, Method; Interpretation & Quality Control of Biochemical tests; Tests for metabolism of carbohydrates; Tests for metabolism of proteins and amino acids; Tests for enzymes; Tests for metabolism of fats; Rapid identification systems.
11.	Antibiotics in Laboratory Medicine: Antibiotics & mechanism of action MIC & MBC (Minimum inhibitory concentration & Minimum bactericidal concentration); Invitro susceptibility tests diffusion methods; Mechanism of antibiotic resistance; Detection of methicillin resistant staphylococci.
12.	Principles of Disease and Epidemiology: Introduction to epidemiology with brief aspect on pathology, infection, disease, normal flora & opportunist; Detailed aspect of host-parasite relationship; Patterns of diseases-development of the disease, predisposing factors; Spread of infection- Reservoirs, transmission, portals of exit; Epidemiology of nosocomial infections & the compromised host; Mechanism of pathogenicity.

ADVANCED MICROBIOLOGY (P) – MBL16115P

1. Collection of Clinical Specimens and Their Processing In Laboratory.
2. The Microscope.
3. Sterilization and Disinfection.
4. Identification of Organism by Biochemical Reaction.
5. Staining Techniques.
6. Media for Routine Cultivation of Bacteria.
7. Culture Techniques.
8. Control of Microbial Growth.
9. Antibiotic Susceptibility Test.

ANALYTICAL AND PHYSICAL BIOCHEMISTRY – BCH16111

UNIT	CONTENT
1	Biophysical Chemistry: Electrolytes - Definition, ionization of weak acids, weak bases pH, Henderson Hasselbach equation; Buffer systems - definition, titration curve of weak acids, buffering capacity, physiological buffers, Respiratory and metabolic acidosis and alkalosis; Law of mass action - K_{eq} , activity coefficient; Osmosis - definition, osmotic crisis, transportation across membrane by membrane proteins; Dialysis - definition, purification of proteins on basis of solubility, size, charge and binding affinity; Definitions - viscosity, surface tension; Donnan equilibrium - K_{eq} , membrane hydrolysis.
2	Biological Oxidation & Bioenergetics: Protein folding in terms of free energy changes, Entropy, Laws of Thermodynamics useful thermodynamic function for understanding enzymes, Biomedical Importance, Redox Potential, Enzymes Involved In Oxidation, and Reduction; transport of molecules active and passive; involvement of ATP in biological systems.
3	Radioactivity: Radioactivity- types of radioactive decay with examples; Radioactive half-life; Units of radioactivity; Application of radioisotope in clinical chemistry.
4	Immunoassays and Application To Biochemistry: Radio Immuno - Assays (RIA); Determination of Hormones by Using Radio Immuno assays (RIA); Nonisotopic Immuno Assays; Homogeneous Enzyme Immuno Assays; Heterogeneous Enzyme Immuno Assays; Enzyme Linked Immuno-Sorbant Assay (ELISA); Chemiluminescence & Bioluminescence; Microparticle Enzyme Immuno assay (MEIA); Fluorescence Polarization Immuno assay (FPIA); Radio Active Energy attenuation (REA) Assays.
5	Chromatography and Application in Biochemistry: Chromatography Definition; Types of Chromatography- Adsorption Chromatography; Partition Chromatography; Ion-exchange Chromatography; Gel Filtration; Affinity Chromatography; Paper Chromatography & its Applications; Thin Layer Chromatography & its Applications; Column Chromatography & its Applications; High Performance liquid Chromatography (HPLC) & its Applications- Diagnostic Application of DNA Probes, Clinical Significance, Application of DNA (RNA)

	Probes, Separation & Identification of Amino Acids by Circular Paper Chromatography.
6	Electrophoresis: Definition, General Methodology; Factors affecting migration of charged particles; Proteins separation by gel Electrophoresis; Isoelectric Focusing; Two Dimensional Electrophoresis; Protein purification and Evaluation – total protein, total activity, specific activity, yield, purification level; Densitometry; Blot Techniques- Southern & Northern Techniques; Ultracentrifugation, valuable for separating Biomolecules and Determining their masses; Fractionation of Serum Proteins by Agarose Gel Electrophoresis; Fractionation of Lipoproteins by Agarose gel Electrophoresis; Western Blotting Techniques for Detection of proteins Separated by gel Electrophoresis.
7	Spectrophotometry: Protein Mass Determination by Mass Spectrometry; Protein Purification; Protein analysis; Protein Sequence; Immunological techniques For Protein Investigation; Antibodies to Specific Proteins; Enzyme Linked Immuno sorbent assay; NMR spectroscopy & X- ray Crystallography for three Dimensional Protein structure.
8	Fluorimetry: Principles; Factors Affecting Fluorescence; Fluorescent Markers – Visualization of Proteins in the Cell; Components of Fluorimeter; Advantage of Fluorimeter.
9	Reflectance Photometry & Immunochemical Techniques: Introduction & Applications; Flame Photometry; Immunochemical Techniques.

ANALYTICAL AND PHYSICAL BIOCHEMISTRY (P) – BCH16111P

1. Cleaning of Glassware.
2. Collection of blood with evacuated or vacuum tubes.
3. Preparation of 2/3 N Sulfuric Acid from 1N sulfuric acid. Required Quantity 150 ml.
4. Preparation of protein free filtrates of blood by using a micro method.
5. Water distillation Plant.
6. Preparation of 200ml Phosphate buffer (m/15, pH-7.45) and Determination of pH by using a pH meter.
7. Sterilization.
8. ELISA (Indirect method).
9. ELISA (Direct method).
10. Determination of Electrolytes by Auto Analyzer.

MASTER OF MEDICAL LAB. TECHNOLOGY-MMLT

BLOOD BANKING AND IMMUNOPATHOLOGY – BBN16102

UNIT	CONTENT
1	Blood Banking: Basic principles of Immunohaematology; methods of collection of blood; preparation and labeling of anticoagulant bulbs; human blood groups antigens and antibodies; ABO Blood group systems; sub- groups; source of antigens and types of antibodies; Rh Blood group systems; types of antigens; mode of inheritance; types of antibodies; Other blood group antigens; Blood collection; selection and screening of donor; collection of blood; various anticoagulants; storage of blood; materials and reagents used for different investigations in blood bank; HDN; Quality assurance in Transfusion Service.
2	Storage & Transport: Storage of blood ; changes in blood after storage; Gas refrigerator; lay out of a blood bank refrigerator; transportation; Compatibility testing: purpose; single tube compatibility techniques using AHG reagent; emergency compatibility testing; difficulties in cross matching; labeling & issuing cross-matched blood.
3	Blood Component: Introduction, overview of blood components; collection of blood components for fractional transfusion; platelets packed Red cell, platelet rich plasma, platelets concentrate; preparation of concentrated (packed) red cells; techniques of preparation.
4	Blood Grouping Techniques: Antibody screening and Identification; Compatibility testing; Blood collection and processing; Preservation and storage of blood; Blood component preparation and therapy; Screening tests; New generation equipments in blood bank.
5	Transfusionology: Blood Bank management and planning the receiving and recording of blood samples; indexing; maintaining blood bank records; legal aspects in starting and running of a blood bank; knowledge of maintenance and working of Blood bank refrigerators, Welkin coolers, refrigerated centrifuge incubators, ovens, autoclaves etc; Transfusion reactions- recognition and investigations; actions to take when transfusion reaction occurs; criteria used while selecting a blood donor; Special investigations in Transfusion technology.
6	Records Blood Donor & Maintenance of Blood Bank Records: Blood donation record book; recording results; blood donor card; blood bank temperature sheet; blood bank stock sheet; blood transfusion request form; Quality control in blood banks- specimen collection; risk assessment for AIDS and serum hepatitis.
7	Immunopathology: History of Immunology and Immunopathology; Review of Basic Immunology; Vaccines; Immunodeficiencies- B cell, T cell , Combined, Phagocytic & Compliment & Hypersensitivity reactions; Cancer and the immune system; Autoimmune diseases; Clinical Laboratory methods for the detection of antigens and Antibodies; Clinical Laboratory methods for the detection of cellular immunity; Histocompatibility testing; Molecular genetic techniques for clinical analysis of the immune systems; Experimental animal methods; Raising antibodies in laboratory animals; Recombinant DNA Technology; Gene transfer to Mammalian cells; Separation serum protein by different electrophoresis; Separation of different cells in the blood.
8	Immunology and Serology: Disease of immune system: AIDS, Auto immune diseases; Hormones- thyroid hormone, growth hormone, insulin, Glycosylated Hemoglobin, COOMB'S test; Direct and Indirect test; Titration of Anitbody.
9	Transplantation Immunology: Introduction; types; transplantation techniques; transplant rejection; Immune response to infectious diseases.

BLOOD BANKING AND IMMUNOPATHOLOGY (P) – BBN16102P

1. Estimation of Hemoglobin.
2. Measurement of Blood Pressure.
3. Determination of Blood Group ABO and RH System.
4. Compatibility Test.
5. Direct and Indirect Coomb's Test.
6. Qualitative Determination of HIV 1/2 Antibody.

7. Rapid Detection of Hepatitis B Surface Antigen (HbsAg) by Immuno filtration Method.
8. Detection of Hepatitis C Virus (HCV) Antibodies.
9. ELISA Test for the Detection of Antibodies to HIV-1 and HIV-2.

LAB MANAGEMENT AND TECHNIQUES – MLT16103

UNIT	CONTENT
1	Laboratory: Role of laboratory in human health and diseases; Human diseases and methods of diagnosis; Laboratory at different level (National/State/District); Duties and responsibilities of laboratory personnel; Laboratory services are a backbone of health care delivery system; Types of laboratory, Laboratory management; prevention of transmission of pathogens; Role of technician.
2	Laboratory Glassware, Chemicals and Equipment: General Principles of Care, storage and Cleaning of general and volumetric Glassware; Making Simple Glassware in the Laboratory; Care of equipment and apparatus; Laboratory chemicals – Proper use, care, storage and labelling; Different grade of chemicals, preparation of solution and reagent; Buffer: preparation of buffer; Specimen handling - Appropriate container; Method of collection; Method of transportation; Method of preservation and disposal of laboratory waste.
3	Laboratory Instruments: Basic knowledge about the working principles, uses and care of laboratory Instruments - Balance, pH Meter, Centrifuge, Cyclo -mixer, Magnetic stirrers, Spectrophotometer, Microscopes (Optical and Electron), Distillation plant, Flame photometer, Laminar flow, Autoclave.
4	Laboratory Techniques: Electrophoresis; fluorescence spectrophotometer; Densitometry; Chromatography; Blot techniques.
5	Laboratory Automation: Continuous and Discrete analyzers; Green Laboratory - Disposal

	of laboratory waste; Disinfection of laboratory; Sterilization of some laboratory apparatus.
6	Lab Management: Ethics of the pathological clinics; Personality development and patient relationship; reports writing; Accountancy in clinical pathology Hospital Management; Operation ethics; Social ethics; Proper handling of instruments.
7	Laboratory Planning: General principles; Laboratory goals; Operational data; Market potential; Selection of area; Competition; Laboratory trends, Space requirements, Designing of laboratory sections; Staff and their duties, Work schedule and workload assessment.
8	Laboratory Safety: General principles of safety programmes; First aid and safety measures for Mechanical, Electrical, Chemical, Radioactive and Biological hazards; Universal safety precautions.
9	Quality Control and Quality Assurance: Quality control and quality assurance in laboratory of (a) Biochemistry, (b) Microbiology, (c) Haematology and Blood Banking (d) Histopathology and Clinical Pathology; Total quality management: Frame work, Quality control chart, Levy-Jenning and Cusum charts, Reference range; Current trends in laboratory accreditation. Medico legal problem.

ADVANCED HEMATOLOGY AND IMMUNO-HEMATOLOGY – PAT16103

UNIT	CONTENT
1	Blood Cells: Red blood cells - Normal morphology count; Isolation from whole blood & count; Effect on count & morphology of physiochemical parameters & the diseased state; Red cell anomalies & their relevance with respect to normal & diseased state; White blood cells & platelets - Morphology count & methods of isolation; Effect on count & morphology of cell by the physiochemical parameters and diseased state & the relevance of condition of the diseases.
2	Physiological Variations in Blood Components: Introduction; Physiological variations in hemoglobin; Packed cell volume; Erythropoietin; Leukocyte count; platelets count; normal red cell values.
3	Anaemia: Definition & courses; Types of anemia & their classification; Physiochemical, characteristic, features & etiology of aplastic anemia, hemolytic, megaloblastic; clinical features & diagnosis of anemia; Leukaemia: Definition (in general) & their etiology; Classification of leukemia; FAB classification; Etiologies, physiochemical features of different Type of leukemia's with reference to clinical states; Diagnosis of different types of

MASTER OF MEDICAL LAB. TECHNOLOGY-MMLT

	leukemia's.
4	Coagulation Studies: General pathways (intrinsic & extrinsic); Properties (physiochemical) mode of action of coagulation factors; Platelet studies, platelet function tests (for different Coagulation factors); Effect of promoters & inhibitors at diff steps in coagulation, their solution & mode of action; Diseases associated with coagulation disorders, their etiology & characteristics features.
5	Cytochemical Staining Procedure in Various Hematopoietic Disorders: Bone marrow; bone marrow aspiration; bone marrow biopsy; bone marrow preparation; staining of bone marrow preparation; Romanowsky stains; Pan-optic staining.
6	Radioisotopes in Hematology: Substances and equipment for radioisotope calculation; measurement of blood, red cell and plasma volume; measurement of total blood volume; estimation spleen red blood cells, other formulas for isotopes in hematology; plasma iron clearance test; leukocytes imaging and imaging methods including Pet scan.
7	Safety Measures for Handling Radioisotopes: Radioisotopes in hematology; General safety guidelines; special guidelines; special recommendations, transport of radioactive material, storage of isotopes; radioisotope properties and precautions; classification of radioisotope laboratories.
8	Molecular Diagnosis in Hematology: An overview of molecular biology; extraction of Nucleic acids: the Starting point for Molecular assays; Polymerase chain reaction: the indispensable molecular techniques; DNA Sequencing: the technique Driving the Genomic revolution; Blotting and Array methods; Flowcytometry; Fluorescence in situ hybridization (FISH); Immunophenotyping; other Molecular techniques in Haematology- applications of PCR in hematology.
9	Quality Assurance in Hematology: Quality vs. quality assurance; elements of quality assurance; external quality control; laboratory accreditation.

IMMUNOLOGY AND MOLECULAR BIOLOGY – MBL16116

UNIT	CONTENT
1.	Introduction to Immune System: History of immunology; Concept of Immunity & Immune response; Innate immune system-properties and mechanism, nonspecific defense system; Adaptive immune system-properties and mechanism, cells involved, MHC and its role; Memory, specificity, diversity, self vs non-self-discrimination; Structure and functions of primary and secondary lymphoid organs; Cells Involved in Immune Responses: Phagocytic

MASTER OF MEDICAL LAB. TECHNOLOGY-MMLT

	cells and their killing mechanisms; T and B lymphocytes; Differentiation of stem cells and idiotypic variations. Nature of Antigen and Antibody: Antigen vs Immunogen, Haptens; Structure and functions of immunoglobulin's; Isotypic, allotypic and idiotypic variations.
2.	Complement System & Hypersensitivity: Role of complement system in immune response; Complement components & activation pathways; Monoclonal antibodies-production, characterization & application in diagnosis, therapy & basic research; Important parameters of serological test; Avidity & affinity measurement; Definition of Hypersensitivity, Classification of Hypersensitivity; Factors causing hypersensitivity; Common hypersensitivity reaction; Classification & types of hypersensitivity reaction; Autoimmune diseases.
3.	Immunodiagnosics: Precipitation techniques & its application; Procedure, interpretation & application of agglutination, compliment fixation, neutralization & opsonisation; Fluorescence techniques; ELISA; RIA; Double diffusion & Immuno electrophoresis; Procedure & interpretation of VDRL test, WIDAL, Leptospira antibody test, Cryptococcal antibody test, RA Factor, Blood grouping, Rh typing, Coomb's test; Clinical laboratory methods for- Detection of cellular immune function; Delayed hypersensitivity skin tests; Assay for lymphocytes; Flow cytometry and cell sorting; Monoclonal antibodies, hybridoma technique, purification & characterization, application in biomedical research, clinical diagnosis.
4.	Prophylactic Immunization: Concept & definition of immunization; Types of immunization; Introduction to vaccines in detailed; Types of vaccines; National immunization schedule; Vaccines-immunoprophylaxis & immunotherapy; Types of vaccines; Immunity against bacterial, viral, fungal & parasitic diseases, advances in the development of vaccines.
5.	Fundamentals of Molecular Biology: Introduction and history; Continuity of life-heredity, variation; Transmission genetics; Mendel's laws of inheritance; Mendel's gene transmission; The chromosome theory of inheritance; Patterns of inheritance- Incomplete dominance, Multiple allelism, Quantitative inheritance; Recombination; Physical evidence of recombination; Deoxyribonucleic Acid (DNA)- Structure, types, coiling and super coiling; Topoisomerases, Replication; Satellite DNA; Organization of prokaryotic and eukaryotic genome; Chromosomes- structure, number, sex chromosomes; Human karyotype, Methods for chromosome analysis – chromosome banding, FISH, CGH, flow cytometry, cell cycle, mitosis and meiosis.
6.	Transcription and Translation: Factors involved; RNA processing; Types of RNA; Genetic code; Lac operon; Tryptophan operon; Regulation in eukaryotes; Gene dosage and Gene amplification; Generation of antibody diversity.
7.	Mutation: Spontaneous; Induced; Point mutation and Silent mutation; Frame-shift mutation; Physical and Chemical mutagens; Molecular basis; Site directed mutagenesis; Significance of Mutagenesis; DNA repair; Isolating mutants; Ames test.
8.	Recombinant DNA Technology: Necessary elements – enzymes and their properties; DNA Ligase; DNA ligase; DNA modifying enzymes; Cloning vectors plasmids; Cosmids; Bacteriophages; Shuttle vectors; Expression vectors; Construction of rDNA and cloning strategies– various methods, genomic libraries (e.g. Using phage vectors), cDNA libraries; Introduction of rDNA into host-methods; Restriction maps and Sequencing.
9.	Nucleic Acid Analysis: Extraction; Purification and analysis of mRNA from eukaryotic cells; Methods for synthesis of double strand cDNA; Expression profiling; Transcriptome analysis; RT PCR and Real Time PCR; Rapid DNA sequencing techniques like Sanger's dideoxynucleotide, partial ribonucleotide substitution; Maxam and Gilbert's method; Pyrosequencing and single molecule sequencing; Genome; Genome sequencing; DNA Sequence Characterization (Open reading frames, promoters, coding frames).

YEAR II

BIOSTATISTICS AND EPIDEMIOLOGY – BOX16203

UNIT	CONTENT
1	Introduction to Biostatistics: Biostatistics; Role of statistics in health science and health care delivery system; Evaluation of methods; Interference in Chemical Analysis.
2	Sampling: Sample; Sampling; Reasons for sampling - Probability and non-probability sampling; Methods of probability sampling - Random sampling, Systematic Sampling, Stratified sampling; Random Number Table; Organization of Data - Pie Charts, Histograms, Single Bar Graphs, Line Graphs, Broken Line Graphs.
3	Frequency Table and Others: Frequency table; Histogram; Frequency polygon; Frequency curve; Bar diagram; Pie chart.
4	Mean, Median & Mode: Mean; Median; Mode; Quartiles; Percentiles; Computation (for raw data) - Merits, Demerits and Applications.
5	Measures of Variation: Range; Inter quartile range; Variance; Standard deviation; Coefficient of variation; Skewness and kurtosis.
6	Basic Probability Distribution: Concept of probability distribution - Probability Distributions; Normal, Poisson and Binomial distributions - Normal Distributions, Poisson Distributions, Binomial Distributions; Concept of sampling distributions; Standard error and confidence intervals - Confidence Intervals; Reference Intervals And Clinical Decision Limits.
7	Tests of Significance: Basic of testing of hypothesis - Null Hypothesis (H_0), Alternate Hypothesis, Type I and Type II errors, Level of significance, Power of the test, p value; Tests of significance - t test, Chi square test, Test of proportion.
8	Correlation and Regression: Scatter diagram; Correlation Coefficient - Properties of Correlation Coefficient, Examples of Correlation Coefficient, Values of the Pearson Correlation; Pearson and Spearman testing the significance of correlation coefficient; Linear and multiple regression - Multiple Regression, Hypothesis, Testing of Hypothesis, t Test, Chi-square Test, Test for ANOVA.
9	Epidemiology: Definition, concept and role of Epidemiology in health and disease; Terms used in describing disease transmission and control; Modes of transmission and natural history of a disease - Natural History of a Disease; Measures for prevention and control of communicable and non-communicable diseases; Principal sources of epidemiological data; Definition, calculation and interpretation of the measures of frequency of diseases and mortality - Measures of Mortality; Need and uses of screening tests - Analysis of Screening; Accuracy and clinical value of diagnostic and screening tests; Causal Association and Various types of epidemiological study designs - The Four Most Common Types of Epidemiological Studies, Problems in Conducting Epidemiological Studies; Critical evaluation of published research.

SYSTEMIC BACTERIOLOGY AND DIAGNOSTIC MICROBIOLOGY
- MBL16213

UNIT	CONTENT
1	Systemic Bacteriology: Introduction; Staphylococcus; Streptococcus Pneumonia or Pneumococcus; Enterococcus; Neisseria - Neisseria Gonorrhoea, Neisseria Meningitis; Corynebacterium Diphtheriae; Listeria; Lactobacillus; Clostridium; Brucella; Bordetella; Legionella Pneumophila; Campylobacter; Helicobacter Pylori; Mycobacterium; Rickettsiae; Spirochaetes; Enterobacteriaceae Family; Escherichia coli - Types of Escherichia Coli; Shigella; Salmonella; Klebsiella; Proteus; Morganella; Providencia; Citrobacter; Yersinia, Vibrio Cholera; Pseudomonas; Acinetobacter; Achromobacter (Alcaligenes); The Normal Flora of Human Beings.
2	Pathogenesis of Bacterial Infection: Introduction; Identifying Pathogenic Bacteria; Transmission of infection; Process of Infection; Regulation of virulence factors; Bacterial virulence factors - Toxins, Adhesins, Invasion; Invasion of host cells; Toxins - Bacterial Protein Toxins, Endotoxins.
3	Bacteremia, Septicemia & Infective Endocarditis: Introduction; Bacteremia; Septicemia; Pyaemia; Endotoxemia; Endocarditis - Types of infective endocarditis, Pathogenesis, Diagnosis, Prevention; Pyrexia of unknown origin (PUO) - Causes of Pyrexia of Unknown Origin, Treatment of Classical PUO.
4	Urinary Tract Infection & Sexually Transmitted Disease: Introduction; Urinary Tract Infections - Causative Organisms, Symptoms, Types, Prevention and Treatment; Pathogenesis of UTIs; Specimen Collection for the Diagnosis of UTI; Sexually Transmitted Diseases.
5	Hospital Acquired Infection: Introduction; Hospital acquired infection - Factors influencing the Development of Nosocomial infections; Types of Hospital acquired infection - Urinary Infections, Surgical Site Infections, Nosocomial Pneumonia, Nosocomial Bacteremia, Other Common Hospital Acquired Infections; Hospital Infection Control Program.
6	Diagnostic Microbiology: Introduction; Principles of diagnostic microbiology; Diagnosis of bacterial and fungal Infections; The Importance of Normal Flora; Microbiologic Examination; Antimicrobial Therapy; Anaerobic Infections; Diagnosis of Chlamydial Infections; Diagnosis of Viral Infections; Specimen Selection, Collection and Processing.
7	Bacterial Immuno Serology: Introduction; Enteric fever; Streptococcal infections; Syphilis; Rickettsial infections; Brucellosis; Primary atypical pneumonia; Rapid Serological Methods.
8	Epidemiological Markers of Microorganism: Introduction; Epidemiological Typing; Phenotypic Methods - Biotyping, Phage Typing, Bacteriocin Typing, Serotyping; Genotypic Methods - Plasmid Analysis, Restriction Endonuclease Analysis (REA) of Chromosomal DNA, PFGE of Chromosomal DNA, Southern Blot Analysis of RFLPs, Nucleotide Sequence Analysis.
9	Rapid Diagnostic Methods and Automation in Microbiology: Introduction; Counter Current Immunelectrophoresis (CIE or CCIEP); Gas Liquid Chromatography or Gas chromatography; Micro-calorimetry; Luminescent Biometry; Radio- respirometry; Bactometer method - BacT/Alert, BACTEC 660/730 and VITEK 2; Gene Probing, Real Time PCR 3D; Gene probes; Real-Time PCR.

SYSTEMIC BACTERIOLOGY AND DIAGNOSTIC MICROBIOLOGY **(P) – MBL16213P**

1. Preparing Bacterial Smear.
2. Gram Staining.
3. Bacterial Culture Techniques.
4. Use of the Autoclave.
5. Sterilization of Equipment and Materials.
6. Urine Culture.
7. Blood Culture.
8. Body Fluid and Tissue Culture, Sterile.
9. Genital Culture and Sensitivity.
10. Pus Culture and Sensitivity.
11. Sputum Culture and Sensitivity.
12. Stool Culture.
13. Throat Swab for Beta-Haemolytic Streptococcus Culture.
14. Isolation and Identification of Streptococci and Enterococci.
15. Isolation and Identification of Neisseriae, Mycobacteria and Anaerobes.

CLINICAL BIOCHEMISTRY – BCH16210

UNIT	CONTENT
1	Disorders and Inborn Errors of Carbohydrate Metabolism: Diabetes mellitus – diagnosis, gestational diabetes mellitus; Galactosaemia; Glycogen storage diseases - pompe's disease, Cori's disease, Hers disease, Von GIERKE disease; Determination of glucose in body fluids - ketone bodies, lactate and pyruvate; Glycated proteins, urinary albumin excretion–specimen collection, storage and quantitative assay; Qualitative tests for individual sugars in urine.
2	Disorders and Inborn Errors of Protein Metabolism: Plasma proteins, proteins in body fluids; Analysis of proteins in blood and other body fluids; Electrophoresis of plasma proteins; Aminoaciduria-selected disorders of amino acid metabolism-phenylalanine, MSUD,

	tyrosine, alkaptonuria, melanuria, cystinula, Homocystinuria, Albinism, PKU; Analysis of amino acids – screening test, quantitative tests for specific amino acids; Acute phase proteins:- Diagnosis and significance of C-reactive proteins, alpha feto proteins, alpha1-anti trypsin, alpha2-macroglobulin, haptoglobin etc.
3	Disorders of Lipid Metabolism: Atherosclerosis and coronary artery disease; Disorders of lipoprotein metabolism; Acyl –COA dehydrogenase, Jamaican Vomiting Sickness, REFSUM’s disease, ZELLWENGER’s Syndrome, NORUM’s Disease, Gaucher Disease; Measurement of lipids, lipoproteins and apolipoproteins; Sources of analytical and biological variations in measurements.
4	Organ Function Test: Evaluation of organ function tests; Liver: - LFT, Jaundice, hepatitis, cholestasis, Clinical importance of bilirubin; Kidney:- RFT, renal failure, uremia, nephritic syndrome, renal calculi, renal tabular acidosis, diabetes insipidus, dialysis; Early makers of renal pathology - mircoalbuminuria, albumin: Creatinine ratio; GIT:- Gastric and pancreatic function tests, pancreatitis, Diabetic Profile; intestinal functions; malabsorption syndrome; Cardiac function test; Hypertension profile; Thyroid function test; Feto-Placental function test, Alzheimer’s disease, Prions, Beta amyloid.
5	Electrolytes and Blood Gas Analysis: Specimens for electrolyte determination- sodium, potassium, chloride, bicarbonate, determination of pCO ₂ , O ₂ and pH; Acid-Base balance; Disorders of acid-base balance and their respiratory and renal mechanisms.
6	Disorders of Nucleic Acid Metabolism: Disorder of purine salvage; Uric acid, disorder of purine nucleotide synthesis; disorder of purine catabolism.
7	Biochemical Aspects of Hematology: Disorders of erythrocyte metabolism - hemoglobi-nopathies, thalessemias thrombosis and anemia’s; Laboratory tests to measure coagulation and thrombolysis; Detoxification in the body - polymorphism in drug metabolizing enzymes; Disorders of vitamins and trace elements.
8	Clinical Enzymology: Enzymes in plasma and their origin - general principles of assay, clinical significance of enzymes and isoenzymes; Measurement of serum enzymes in diagnosis – cardiac and skeletal muscle enzymes, liver and biliary tract enzymes digestive, bone and GI disorders.
9	Biochemistry and Diseases: Biochemistry of AIDS - Laboratory analysis, anti HIV drugs, prevention; Pathophysiology of Cancer; Oncogens; Tumor suppressor genes; Apoptosis; Tumor markers-their biochemical and pathological significance, use in management of benign and malignant tumors; Anti-cancer drugs.

CLINICAL BIOCHEMISTRY (P) – BCH16210P

1. Estimation of Vitamin E.
2. Electrophoresis of Serum Proteins.
3. Electrophoresis of Serum Lipoproteins.
4. Separation of sugars by chromatography.
5. Separation of Amino Acids by chromatography.
6. Analysis of ABG.
7. Determination of lactate.
8. Determination of pyruvate.
9. Maple Syrup Urine Disease.
10. Detection of Cystine in urine.
11. Detection of Tyrosine in urine.
12. Determination of Homocystinuria in urine.
13. Determination of Phenylketonuria in urine.

HISTOPATHOLOGY AND CYTOPATHOLOGY – PAT16201

UNIT	CONTENT
1	Histopathology: Introduction & importance of histopathology - Branches of Histopathology, Organisation of Histology Laboratory; Histology equipment, Specimen Reception; Method of specimen collection - Types of Biopsy Procedures, Examination of Tissues and Cells; Automation in Histopathology - New Generation Microtome, Tissue Processing, Embedding, Station, Tissue-Tek, Image Analysis, Stainers and Cover Slippers; Use of Microwave Oven.
2	Tissues Fixative: Tissue Fixative - Simple Fixative and their properties; Micro anatomical fixative - Histochemical fixatives.
3	Tissue Processing: Tissue Processing; Decalcification - Determining the End-point of Decalcification, Neutralization and Processing; Embedding - Microtome, Microtome Knives, Technique of Section Cutting and Mounting on Slide; Frozen Section - Cryostat.
4	Stains and Staining: Dyes and their properties - Theory of staining; Types of staining - H and E Staining, Mounting of Sections, Periodic Acid Schiff (PAS), Feulgen Stain, Masson's Trichrome, Giemsa Stain, Phosphotungstic Acid-haematoxylin Stain, The Papanicolaou Stain; Main characteristics and modification - Factors Influencing Staining Reaction, Stains for Sex Chromatin, Stains for Pigments, Stains for microorganism, Stain for parasites, Stain for carbohydrate, Stain for lipids, Stain for Nucleic Acid.
5	Molecular Histopathology: Molecular Histopathology - Methods in molecular pathology, Tissue micro dissection methods; Amplification method, PCR, Gel electrophoresis methods, Hybridization methods, Nucleic acid sequencing, DNA microarrays, Proteomics; Molecular pathological diagnostics - Molecular genetic testing, Testing Methodology; Molecular oncological testing - Molecular markers of malignant neoplasms, Molecular techniques, Automated Cellular Imaging System.
6	Cytopathology: Cytology and Cytopathology - Fixation, Fixative, Common fixative, Special purpose fixative; Fluid specimen - Preservation before processing, Preparation for microscopy.
7	Cervical Cytology: Overview of Cervical Cytology - Method of Conducting Pap Test, Collection and Transportation, Special Instructions for Requisition, Causes for Rejection of Specimen or Limited Reports; Results of Pap Test - Aspects of Pap Test, Effectiveness of

	Pap Test, Practical Aspects of Pap Test; Bethesda System - Types of Results, Squamous Cell Abnormalities, Bethesda System 2001 for Cervicovaginal Cytology Reporting, Carcinoma - Hormonal assessment, Cytological techniques, Special collection method, Clinical applications.
8	Tissue Typing in Kidney Transplants: Kidney transplant - Tissue typing; Mixed Lymphocyte Reaction - Tissue typing techniques, Minor Histocompatibility antigen.
9	Rheumatological Diseases and Investigations: Introduction to Rheumatological Diseases and Investigation, Autoimmune diseases, Autoimmunity, Pathogenesis of autoimmune diseases: Known autoimmune diseases, Suspected autoimmune diseases, Rheumatological diseases.
10	Cancer Immunology: Cancer - Carcinogenesis, Tumour-related genes; Immune response to cancer - Evasion of immune system by tumour cells; Malignant transformation of cells - Oncogenes and Tumor Suppressor Genes, Effect of Tumors on Host, Host Response against Tumor; Tumor Specific Antigen - Immune Responses, Prospects of Immunotherapy.
11	Recent Advances in Cytopathology: Fine Needle Aspiration Cytology (FNAC); Thin Layer Cytology & Immunofluorescent Techniques - Thin Layer Cytology, Immunofluorescent Techniques, Flow cytometry; Advances in Lung Cytopathology - Advances in Cytopathology for Lung Cancer, Advances in Urinary Cytopathology, Advances in Cytopathological Evaluation of Lymphomas; New Techniques for Obtaining Samples for Cytopathological Examination - Automation in Cytology.

CLINICAL PATHOLOGY AND CYTOGENETICS – PAT16202

UNIT	CONTENT
1	Introduction & Overview of Clinical Pathology, Cytogenetics: Collection, transport, preservation and processing of various clinical specimens - Urine examination, Physical, chemical and microscopic, Urine analysis by Strip method, Test for hemosiderin pigment, Sputum examination, Gastric analysis, Fasting gastric juice – Macroscopic and microscopic examination, Fractional test meal, Augmented Histamine test, Hollander’s test, Cerebrospinal fluid analysis, Microscopic examination, Pregnancy Test-Method, interpretation advantages disadvantages HCG, Semen analysis, Stool examination – Macroscopic (Naked eye) inspection, Microscopic examination for parasites, Strip method, Test for Occult blood – Benzidine Test; Continuity of life - heredity, variation - Mendel's laws of inheritance, Chromosomal basis of inheritance, Other patterns of inheritance, Mutation and chromosomal aberrations, Chromosome Aberration; Human genetics - methods of study - Genetic disorders, DNA as a genetic material - its structure and replication, RNA Structures, Gene expression - transcription and translation, Identification of human chromosomes, Banding techniques, Sex Chromatin bodies, Autoradiography of human chromosomes, Chromosome

	Identification by image analysis and Quantitative cytochemistry, Clinical Manifestations of chromosomal disorders.
2	Genetic Disorders - Diseases Caused by Change in Structural Proteins & Receptor Proteins: Mutations - Types of mutation, Molecular repair mechanisms, Diseases due to defected repair mechanisms; Mendelian Disorders - Transmission pattern of single gene disorders, Autosomal disorders, Sex chromosome related disorders, Marfan Syndrome, Ehlers-Danlos syndrome, Familial hypercholesterolemia, Diabetes, Protein energy malnutrition's.
3	Cytogenetic Disorders: Trisomy of 21st chromosome - Down's syndrome, Klinefelter syndrome, Turner syndrome, Fragile X Syndrome; Pediatric diseases - Congenital anomalies, Prenatal infections, Premature and intrauterine growth retardation, Respiratory distress syndrome of new born, Necrotizing enterocolitis, Sudden death syndrome, Cystic fibrosis, Fluorescent in-situ hybridization for identification of chromosomal abnormalities.
4	Hemodynamic Disorders: Hyperemia and congestion - Hemorrhage, Hemostasis, and thrombosis, Endothelium platelets, Coagulation cascades, DIC embolism, Pulmonary Thromboembolism, Systemic thromboembolism, Fat Embolism, Air Embolism, Amniotic Fluid Embolism, Infraction.
5	Environmental Pollution: Air pollution; Water pollution; Soil pollution; Injury by chemical agents - Injury by therapeutic agents, Exogenous estrogen and oral contraceptive pills side effects, Injury by non therapeutic agents, Injury by physical agents.
6	Fetal and Neonatal Physiology and Pediatric Diseases: Growth and functional development of the fetus - Adjustment of the infant to extra uterine life, Special functional problems in the neonate, Problems of prematurity, Congenital anomalies - Perinatal infections, Syndrome of the newborn, Immune hydrops, Tumors and tumor like lesions of infancy and childhood, The role of fetal factors in programming adult-onset diseases.
7	Gynecopathy: Gynaecological malignancies - Ovarian cancer, Uterine cancer, Cervical cancer, Gestational trophoblastic neoplasia; Sexually transmitted diseases - Syphilis, Gonorrhoea, Trichomoniasis, Human papillomavirus infection; Diseases during pregnancy - Placental inflammations and infections, Ectopic pregnancy, Gestational trophoblastic diseases, eclampsia.
8	Blood and Inflammatory Disorders: Haemostasis – disorders and regulation; Types of Anaemia; Bleeding disorders of man; General inflammatory markers and specific therapeutic bioindicators; C reactive protein (CRP); Rheumatoid Arthritis (RA); Anti Streptolysin O (ASO); Acute inflammation - Vascular changes, Cellular Events; Chronic inflammation - Chronic inflammatory cells and mediators, Lymphatics and lymph nodes in inflammation; Systemic effects of inflammation.
9	General and Systemic Toxicology: Mechanism of toxic effects; Toxicokinetics - Chemical carcinogens and teratogens - Chemical Carcinogens, Teratogens; Treatment of intoxication; Response of Organs to Toxic Agents - Response of Respiratory System to Toxic Agents, Response of Reproductive System to Toxic agents, Response of liver to toxic agents, Response of kidney to toxic agents; Toxic effects of metals; Toxic effects of Solvents; Toxic effects of Environmental Pollutants; Inherited metabolic disorders - Phenylketonuria (PKU), Maple Syrup Urine Disease (MSUD), Homocystinuria, Galactosemia, Gout, Diabetes insipidus, Diabetes mellitus.

CLINICAL PATHOLOGY AND CYTOGENETICS (P) – PAT16202P

1. Methods of Staining (Romanowsky Stain).
2. Hemoglobin Determination.
3. Total Count of RBC.
4. Total Count of White Blood Cells.
5. Determination of Erythrocyte Sedimentation Rate (ESR).
6. Coagulation Time Determination.
7. Determination of Aspartate Amino Transferase (AST).
8. Determination of Alkaline Phosphatase (ALP).
9. Urine Examination: Physical and Chemical.
10. Determination of Homocystinuria in Urine.
11. Enzymatic Kinetic Colorimeter Test for Determination of Glucose in Blood (GOD – POD).
12. Determination of Phenylketonuria in Urine.
13. Maple Syrup Urine Disease.
14. Test for Occult Blood in Stool.
15. Semen Examination.
16. CSF Examination.
17. Determination of CRP.
18. RA Test.

MEDICAL PARASITOLOGY, MYCOLOGY AND VIROLOGY – MBL16214

UNIT	CONTENT
1	General Parasitology: General Parasitology; Classification of medical parasitology; Pathogenesis of parasitic diseases; Immunology of Parasitic Diseases; Host parasite relationship, Opportunistic Parasitic Infections.
2	Diagnostic Parasitology: Systematic study of parasites; Protozoa - General Characteristics of Medically Important Parasites; Plasmodia - Plasmodium Falciparum, Plasmodium Vivax, Plasmodium Malariae, Plasmodium Ovale; Leishmania - Hemoflagellates, Trypanosoma, American Trypanosomiasis, Toxoplasma, Babesia; Helminthes - Helminth Parasites; Nematodes (Round Worms) - Hook Worms, Strongyloides Stercoralis; Intestinal Nematodes without Tissue Stage - Enterobius Vermicularis (Pin Worm or Thread Worm), Trichuris Trichiura (Whip Worm); Tissue Nematodes - Filarial Worms, Loa Loa; Biological Vectors, Arthropods.
3	Clinical and Therapeutic Parasitology: Clinical and Therapeutic Parasitology;

	Examination of Stool for Parasitology - Parasite Concentration in Faeces by Floatation, Examination of Blood for Parasites, Serological Tests for Parasites; Examination of Biopsy Material and Body Fluid; Drugs for protozoal infections - Pharmacotherapy of Malaria, Antibiotics.
4	Mycology: Introduction to Fungi, General characteristics; Taxonomy of Fungi- Binomial nomenclature Classifications of Fungi; Immunity to Fungal Diseases - Innate and Adaptive immunity to Fungi; Laboratory diagnosis fungal diseases - Fungal Tests; Definition of Mycoses and types - Classification of Mycoses; Role of Mycotoxin - Definitions, Etymology and General Principles, Prevention by Antifungal Agents; Culture Media in Mycology - Constituents of Media, Stains in Mycology.
5	Diagnostic Mycology: Specimen collection - Laboratory Methods in Medical Mycology, Direct Examination of Specimens, Fungal Culturing; Biochemical Studies; Identification of some common fungus - Saprophytes; Anti-Fungal Agents; Serological Tests for Mycotic Infections; Use of Laboratory Animals in Mycology - Typing of Fungi; Preparation of Fungal Antigens and their Standardization, Disk Diffusion.
6	Superficial and Subcutaneous Mycoses: Superficial and Subcutaneous Mycoses- Pityriasis Versicolor; Dermatitis; Dermatophytes; Mycetoma.
7	Systemic Mycoses: Mycosis; Systemic Mycoses - Histoplasmosis, Blastomycosis, Coccidioidomycosis, Paracoccidioidomycosis, Penicillium Marneffeii.
8	Opportunistic Mycoses: Opportunistic Mycoses - Candidiasis, Cryptococcosis, Pneumocystosis; Aspergillosis, Zygomycosis; Miscellaneous Opportunistic Mycoses; Rhodotorula Infections; Saccharomyces Infections.
9	Miscellaneous Mycoses: Miscellaneous Mycoses – Oculomycosis, Otomycosis; Fungal infections in eyes; Mycotoxins - Major Mycotoxins; Allergic Fungal diseases - Mycetismus.
10	Virology: Virology: Morphology & structure of viruses - General Properties of Viruses, Viral Structure; Cultivation of viruses in embryonated eggs; Viral assay both physical & chemical methods; Serological methods - Hemagglutination, Complement fixation, Immunofluorescence, Bacteriophage - Structure and Significance of bacteriophage, Some common viruses, Picornaviruses, Orthomyxoviruses, Paramyxoviruses; Retroviruses - Oncogenic Viruses Mainly Retroviruses (HIV); Brief introduction on Arboviruses; Detailed classification of Hepatitis viruses.
11	Human Cancer Viruses: Human Cancer Virus - Timeline of Discovery; Viral Carcinogenesis; Retroviruses - Cellular Oncogenes; Tumor suppressor genes - Anti-oncogenes (Tumour Suppressor Genes), Two-hit Hypothesis; Classes of Tumour Viruses - DNA Tumour Viruses; Mechanism of Causing Human Cancer by Viruses.
12	Pathogenesis and Control of Viral Diseases: Principles of viral diseases - Host Immune Control Mechanisms; Pathogenesis of Viral Diseases - General Concepts; Viral Pathogenesis - Cell Injury and Clinical Illness; Viral Spread and Cell Tropism - Sequence of Virus Spread in the Host; Prevention and Treatment of Viral Infections - Basic Mechanisms, Activity Spectrum of Major Antiviral Compounds.

MEDICAL PARASITOLOGY, MYCOLOGY AND VIROLOGY (P) –
MBL16214P

1. Collection and Preservation of Stool Specimens.
2. Haemagglutination Test.
3. Laboratory Procedures for Malarial Parasites.
4. Techniques for Studying Bacteria and Fungi.
5. Radioimmunoassay (RIA).
6. ELISA.
7. Hepatitis Virus.
8. HIV Detection.

DISSERTATION – DSR16201