

AH 1103 Basic Human Anatomy (02 Credits)

The structure and function of the cell, Organization of the body, Embryology, Structure of ; Cardiovascular system, Lymphatic system, Respiratory System, Digestive System, Genito-Urinary System, Endocrine System, Musculoskeletal System, Nervous System, Sensory Organs.

AH 1104 Human Physiology I (03 Credits)

Organization of the body for function, Homeostasis, Body fluids, Temperature regulation, Growth and development, Ageing, Musculo-skeletal system, Blood (RBC, WBC, Platelets, Blood groups and blood transfusion, Haemostasis, Haematological disorders, body defence mechanisms and immunity), Cardiovascular system, Lymphatic system, Respiratory system, Digestive system.

ML 1101 Laboratory Practice, Safety and First Aid (02 Credits)

Introduction to the laboratory safety, Organisation and design of a medical laboratory, Hazards associated with laboratories and means of prevention, Safety equipments used in the laboratory, Sterilization and disinfection, Laboratory waste disposal, Storage of chemicals and safety aspects, Occupational health in the laboratory, Use of bio safety manual in prevention of laboratory accidents.

ML 1102 General Microbiology (02 Credits)

Introduction to microbiology, History of microbiology, Taxonomy and classification of microbes, Microbial variety, Microbial metabolism and growth, Microbial habitat and transmission, Microbiology of air, soil and water, Microbial pathogenicity, Koch's postulates and proof of causation, Principles of detection and identification of microorganisms, Storage of microorganisms, Bacterial genetics, Basic microbiological techniques.

ML 1103 Genetics and Molecular Biology (02 Credits)

Mendelian inheritance, Laws of inheritance, Major genes, Polygenes, Dominance, Recessiveness, Sex linked inheritance, Pedigree analysis, Cytogenetics and chromosomal aberrations, Molecular genetics, Modern biotechnology, Recombinant DNA technology, Molecular techniques.

ML 1104 Basic Biochemistry (03 Credits)

Basic structure of an eukaryotic and prokaryotic cells, Structure and function of cell organelles, Structure and function of carbohydrates, Lipids, Amino acids, Proteins & nucleic acids, Biochemical tests for identification of carbohydrates, pH and buffers, Enzyme properties and kinetics, Chemistry & function of haemoglobin, Chemistry & functions of vitamins, Minerals and their functions, Metabolism of carbohydrates, lipids, proteins and amino acids, Integration and regulation of metabolic pathways.

AH 1202 Basic Statistics (02 Credits)

Description of statistics, Organizing and displaying data, Summarizing data and variation, Curve fitting, Probability, Simple regression and correlation, Test of hypothesis and significance, Student "t", "F" and chi-square distributions, Analysis of variance.

AH 1203 General Pathology (02 Credits)

Introduction to Pathology, Inflammation and Repair Wound healing and complications, Principles of fracture healing and complications, Growth disturbances, Degeneration and necrosis, Circulatory disturbances, Tissue deposits and Pigments, Immunology, Neoplasia.

AH 1204 Human Physiology II (03 Credits)

Endocrine system nerve & muscle, blocking agents, nerve conduction studies, electromyogram,) nervous system special senses (vision, hearing), urinary system (functional anatomy, functions of the kidney in homeostasis, functions of nephron , forces acting on glomerular capillaries steps.

ML 1201 Specimen Collection & Transport (02 Credits)

Blood collection techniques (Finger prick, Heel prick & Venepuncture techniques), Anticoagulants, Separation of serum & plasma, Preparation of patients, Collection, transport and rejection criteria for different specimens in haematology, biochemistry, microbiology & histopathology, Specimen processing, Safety aspects in specimen collection and transport, Pre-analytical errors in different disciplines.

ML 1202 Analytical Chemistry (03 Credits)

Introduction to basic equipment used in analytical chemistry, Measurement & errors in chemical analysis (Laboratory calculations), Preparation of laboratory reagents & standardization, Titrations, Buffers, Centrifugation, Spectrophotometry and analytical aspects, Electrophoresis, Chromatography, Electro-analytical chemistry in laboratory analysis, Principles of enzymology.

ML 1203 Tissues of the Body (01 Credits)

Introduction, Epithelial tissue, Connective tissue, Bone, Cartilage, Muscle and cardiovascular system, Urinary system, Male and female reproductive system, Liver, Gastrointestinal tract & associated organs, Respiratory system, Reticulo-endothelial system, Lymphoreticular system, Nervous system, Introduction to tissue processing.

ML 1204 Systematic Bacteriology (02 Credits)

Characteristic features, Pathogenicity, Clinical conditions and identification tests of medically important bacteria, mycobacteria, spirochaetes, cell wall free bacteria (mycoplasma, chlamydia, rickettsiae and others).

ML 2101 Haematology I (03 Credits)

Introduction to haematology, Haemopoiesis, Composition of blood, Haemoglobin, Determination of haemoglobin, Packed cell volume, Erythrocyte sedimentation rate, Red cells & red cell inclusions, Abnormalities of red cell morphology, Determination of red cell count & red cell indices, White blood cells & determination of white blood cell count & differential count, Preparation of blood film & common problems in film preparation, Reticulocytes & reticulocyte count, Morphology & function of platelets, Platelet count, Automated haematological analyzers, Determining laboratory errors.

ML 2102 Clinical Biochemistry I (03 Credits)

Structure and function of kidney, Formation & composition of urine, Kidney diseases, Specimen collection for urine analysis, Physical and chemical examination of urine,

Examination of urine deposits, Special urine examination, Renal calculi & chemical analysis of calculi, Spermatogenesis & male infertility, Seminal fluid analysis, Diseases of CNS, Analysis of CSF, Exudates & transudates, Examination of other body fluids.

ML 2103 Histotechnology (03 Credits)

Introduction to histology and relevant equipments, Sample collection and fixation basic steps in histotechnology, Tissue processing, Paraffin embedding & section cutting (microtomy), Haematoxylin and eosin staining and staining artifacts, Special staining techniques, Processing of fresh specimens and cryostat sectioning, Micrometry, Immunohistochemistry and enzyme histochemistry, Quality assurance methods in histotechnology.

ML 2104 Systematic Virology and Mycology (02 Credits)

Introduction to fungi, Classification and general properties of fungi, Yeasts (*Candida*, *Cryptococcus*), Dimorphic fungi, Dermatophytes, filamentous fungi pathogenic to humans. Introduction to viruses including classification and general properties of viruses; General aspects of virology with reference to DNA viruses, RNA viruses Pathogenesis and control of viral diseases.

ML 2105 Systematic Parasitology and Medical Entomology (02 Credits)

Introduction to parasitology intestinal protozoa, Tissue protozoa, Intestinal nematodes, Tissue nematodes, Trematodes, Cestodes, Medically important mosquitoes & other arthropods, Zoonotic parasitic diseases.

ML 2106 Diagnostic Bacteriology (03 Credits)

Normal flora and collection and transport of specimens, Use of microbiology laboratory in the diagnosis of respiratory tract infections, Gastrointestinal infections, Sexually transmitted infections, Central nervous system infections, Bacteraemia/ infective endocarditis, Skin and wound infections, Urinary tract infections, ENT & eye infections, Infection in the compromised host. Choice of appropriate test in an infective disease, Antibiotics & their mode of actions, Principles & procedures of different types of antibiotic sensitivity testing (ABST) methods used in diagnostic & research laboratories, Antibiotic resistance mechanisms & methods of their detection and quality assurance in a microbiology laboratory.

ML 2201 Haematology II (03 Credits)

Classification of anaemia; G6PD deficiency, Thalassaemia and haemoglobinopathies, Investigations and interpretation of thalassaemia and other haemoglobinopathies, Interpreting haemoglobin Electrophoresis, Leukaemia, Pancytopenia, Myeloproliferative disorders, Paraproteinaemia, LE cells, Blood coagulation disorders and coagulation tests, Bone marrow smears.

ML 2202 Clinical Biochemistry II (03 Credits)

Regulation and abnormalities of carbohydrate, Lipoprotein, Serum protein and bilirubin metabolisms, Diabetes mellitus, Acute and chronic liver disease, Specimen collection and methods of serum glucose determination under different clinical entities, Lipoprotein,

Bilirubin serum protein testing, Liver function tests, Rectify the possible errors and quality control in above testing.

ML 2203 Diagnostic Virology and Mycology (02 Credits)

Pathogenesis, laboratory diagnosis and prevention of fungal infections of medical importance including infections caused by yeasts (*Candida*, *Cryptococcus*), dimorphic fungi, dermatophytes and other filamentous fungal infections in humans. Pathogenesis, laboratory diagnosis and prevention of viral infections caused by DNA viruses maternal viral infection that affect the foetus and neonate; pathogenesis, diagnosis and control of emerging and re-emerging viral infections in the world and in Sri Lanka.

ML 2204 Cytotechnology (02 Credits)

Introduction to cytotechnology, Overview of cytopreparatory techniques, Cytological sampling of female genital tract, Respiratory tract, GIT & body cavities, CSF and urine cytology, Skin scrapings, Needle aspiration biopsies, Basic cervical cytology, Ancillary techniques in cytology, Error identification, Quality assurance in cytology.

ML 2205 Diagnostic Parasitology (02 Credits)

Micrometry relevant to parasitology, Collection, transport & preservation of specimens, Faecal examination- wet smears, Concentration techniques, Culture techniques, Permanent staining trichrome, Iron- haematoxylin, Acid fast stains, Blood examination- malaria, Filariasis, Concentration techniques, Immunodiagnosis & molecular diagnosis, Arthropods of medical importance- identification, Preservation & transport to reference labs, Collection & dissection of medically important insects, Quality control and quality assurance in parasitology.

ML 2206 Immunotechnology (02 Credits)

Introduction, Innate & acquired immunity, Antigens & Antibodies, Humoral & innate immunity, Antigen-antibody reactions, Complement system, Laboratory diagnosis of autoimmunity, Laboratory diagnosis of immunodeficiency, Immunotechnology, Immunoagglutination, Immunohistochemistry, Antibody titres, Immunofluorescence, Radio-immunoassay, ELISA, Immuno-electrophoresis, Flowcytometry.

ML 3101 Haematology III (02 Credits)

Introducing blood bank, Blood grouping, Screening for infectious diseases, Preparation of blood components, Blood transfusion, Cross matching, Compatibility testing, Rh blood group system, Direct and Indirect Coomb's tests, Leucodepletion, Haemolytic disease of new born.

ML3102 Clinical Biochemistry III (03 Credits)

Clinical Enzymology, Cardiac markers, Tumor markers, Renal diseases and renal function tests, Mineral metabolism, Serum electrolytes, Flame photometry, Thyroid disorders and Thyroid function Tests, Point of care testing, Errors in diagnostic testing.

ML 3103 Public Health Microbiology (02 Credits)

Introduction to public health microbiology; Outbreak investigations, infections / emerging infections (mosquito borne infections) and zoonotic diseases. Investigations on food, milk

and water quality. Bio-terrorism and bio-invasion. Prevention and control of infection in the light of one health approach.

ML 3104 Laboratory Quality Assurance & Accreditation (03 Credits)

Introduction to Quality Management System (QMS), Concepts of Quality Assurance, Internal quality control, External quality assurance, Standards, quality control & reference materials, Establishment of method verification & performance specifications, Quality indicators, Systematic troubleshooting, Quality control in pre-analytical & post-analytical procedures in different disciplines of laboratory tests, Internal audits, Document control in the laboratory.

Introduction to laboratory accreditation, ISO 15189 standards, Sequence of accreditation, Preparation of necessary documents (specimen collection manual, procedure manual and quality manual) for accreditation, Management and technical requirements, Method of internal auditing, Measurement of uncertainty for different tests, Calibration of equipment, Identify the opportunities for continual improvement within an organization.

ML 3105 Laboratory Management (02 Credits)

Basic management concepts, Scope of medical laboratory management & laboratory manager's role, Laboratory planning & organization, Specimen management & processes, Personal management & training, Equipment management, Financial management, Chemical management & ordering process, Data management & statistics, Health & safety in laboratory, Medical laboratory waste management, Occurrence management, Root cause analysis as a problem solving tool, Customer satisfaction surveys, Principles of Good Laboratory Practice & its application, Risk assessment, Supply chain management.

ML 3106 Biomedical Instrumentation (01 Credits)

Basic concepts, calibration & maintenance of analytical balance, microscope, refrigerator, freezer, centrifuge, cytocentrifuge, incubator, oven, water bath, automated pipette, refractometer, spectrophotometer, bio safety cabinet, automated blood culture analyzer, automated haematology analyser, semi / fully automated biochemistry analyser, tissue processor, microtome, ELISA machine, PCR machine.

ML 3201 Work Based Learning - Haematology I (4 Credits)

Preparation of glassware for haematology, Measurements of haemoglobin, PCV, Red cell count, White cell count & differential counts, Blood film preparation & staining, ESR, Platelet count, Bleeding time, Clotting time, APTT and prothrombin time, Reticulocyte count, Full blood count, Blood pictures (anaemia, thalasaemia, leukaemia).

ML 3202 Work Based Learning - Clinical Biochemistry I (4 Credits)

Specimen collection and transport, Specimen processing & manual analytical techniques, Urine full report, Urine ketone bodies, Bile, Urine specific gravity, Seminal fluid analysis, Body fluid analysis, blood glucose (FBS, PPBS, OGTT), Blood urea, BUN, Serum creatinine, Serum bilirubin, Serum proteins, Serum electrolytes.

ML 3203 Work Based Learning - Blood Bank Serology (2 Credits)

Blood grouping, Cross matching, Direct & indirect Coomb's tests, Preparation of blood components /products, Antibody screening & identification, Genotyping, Rh antibody titres, Cold antibody titres, Rare blood groups, Discrepancies in blood grouping & problems in cross matching and HLA typing.

ML 3204 Work Based Learning- Histotechnology I (3 Credits)

Collecting procedure, Collecting containers, Tissue accession, Labeling / request forms, Tissue logging, Preparation of fixatives for histological work, Preparation of tissue specimens for processing, Decalcification & assessment, Dehydration procedures, Clearing, Wax impregnation & embedding, trimming , Cutting & mounting, Theory of different types of staining mechanism, H&E staining of tissue slides and examination of H&E stained slides.

ML 3205 Work Based Learning - Microbiology I (3 Credits)

Specimen collection and transport, Processing & culture of specimens, Virus culture, Fungal culture, Gram stains, Methylene blue stain, ZN stain, Negative stain & identification of capsules, Preparation of stains, reagents & culture media, Sterilisation and disposal of cultures, Hanging drop & motility testing, Identification of bacteria including biochemical tests..

ML 3206 Work Based Learning - Immunotechnology and Hormone assays (01 Credits)

Agglutination test, Immuno-histochemical tests, Antibody titres, Immunofluorescence, RIA, ELISA, Immunoelectrophoresis, Flowcytometry, Fluoccculation test, Precipitation tests, Nephelometry, Strip tests.

ML 4101 Work Based Learning - Haematology II (03 Credits)

Special haematological investigations, Investigation of haemolytic anaemia, Osmotic fragility test, Special coagulation tests, Coagulation factor assay and correlation test, Bone marrow-slide preparation and staining, Examination of marrow specimens, Haemoglobin electrophoresis, Preparation of stains/ reagents, Alkaline denaturation test, Glycosylated haemoglobin test, Special staining techniques, Solubility test, Sickling test, Quality control in a haematology laboratory.

ML 4102 Work Based Learning - Clinical Biochemistry II (03 Credits)

SGOT/SGPT, Serum amylase, Alkaline phosphatase, Serum proteins, Preparation of reagents, Serum uric acid, Creatinine clearance, Preparation of 24 hour urine bottles, Urine micro albumin, Blood urea, Blood urea nitrogen, Serum creatinine, Serum bilirubin, Serum proteins, Serum protein electrophoresis, Serum electrolytes, Quality control in a clinical biochemistry laboratory.

ML 4103 Work Based Learning - Microbiology II (02 Credits)

Processing of clinical samples, Isolation and identification of micro-organisms, Quality control in a diagnostic microbiology laboratory, Antibiotic sensitivity testing, Serology in a diagnostic microbiology laboratory.

ML 4104 Work Based Learning - Histotechnology II & Cytotechnology (03 Credits)

Preparation of special stains, Special staining techniques, Frozen sections, Cryostat sections, Immunohistochemistry, Enzyme histochemistry, Transport of fresh and other special type of

specimens, Special care in handling chemicals used in histotechnology, Identification of histotechnological errors in prepared slides, Automation in the histology laboratory, Quality assurance in histotechnology. Preparation of fixative for cytological work, FNA cytology staining & examination, PAP smear staining & screening, Preparation of stains.

ML 4105 Work Based Learning - Emergency Laboratory Tests (01 Credits)

Urgent diagnostic tests performed in emergencies, Reporting of night laboratory test results, Common errors in night laboratories.

ML 4106 Work Based Learning - Medical Parasitology & Entomology (02 Credits)

Preparation and examination of wet faecal smears for protozoans and helminthic infections, Preparation & staining of blood smears and identification of malaria parasites, Blood film staining, examination & identification of filarial parasites, Rapid diagnostic tests, Immunological tests, Preparation of stains, Mosquito larva and adult identification, Other important arthropod vectors.

ML 4107 Work Based Learning – Sexually Transmitted Diseases (01 Credits)

The role of the laboratory in the diagnosis and the management of STDs, Laboratory diagnosis of; HIV infection, syphilis, Gonorrhoea, Chancroids (direct smear – gram stain), Vaginitis

ML 4108 Work Based Learning – Laboratory Management (01 Credits)

Calculate monthly work load using specimen registers, Calculate and prepare annual indent, Reception and storage of hazardous and non-hazardous laboratory chemicals, Maintain major laboratory equipment, Make local purchasing according to financial regulations, Documentation of local purchases, Identify major and minor supplies for effective laboratory work, Repair and remove unserviceable equipment, Maintain laboratory inventory registers, Document laboratory plan, Develop emergency procedures.

AH 4109 Research Methodology and Scientific Writing (02 Credits)

Traditions, preferences and positions in applied qualitative research, Narrative methodologies and their use in clinical/professional practice, Quantitative reasoning and its application in clinical/professional practice, Data gathering tools/approaches – qualitative and quantitative methods and analysis, Qualitative and quantitative study designing and Questionnaire development, Introduction to undergraduate research project proposal, Use of English grammar in scientific writing, Use of statistics & statistical software in data analysis, Preparation of the presentation & improving presentation skills, presentation of the research proposal.

ML 4201 Biotechnology (01 Credits)

Overview of DNA structure and function, Chromosome structure, Remodeling and regulation of gene expression in prokaryotes and eukaryotes, Extended topics to be covered including the methods in advanced recombinant DNA technology, micro-RNA, Functional genomics, Mechanisms of differential gene expression and PCR, DNA methylation, Silencers, Enhancers, Genomic imprinting, Microarray analysis, DNA fingerprinting & sequencing.

ML 4202 Experimental Laboratory Medicine (02 Credits)

In-vitro – Introduction to *in-vitro* and *in-vivo* experimental techniques, Introduction to cell lines, Maintenance and culturing cells, Specific application of cell lines for research purposes.

In-vivo – Use of laboratory animal in research, Laboratory animal Biology, Nutrition, Welfare, Planning and Handling of laboratory animal, Alternative techniques used for laboratory animal research.

ML 4203 Bioethics (01 Credits)

Introduction and definition of terms, history, codes of ethics – Hippocratic oath and other codes, principles of medical ethics, ethics in public health – rights, duties, obligations related to health care professionals and patients, ethical issues related to professionalism, truth telling and informed consent confidentiality, ethics and mental health, ethics in research, the use of animals in research, ethics and biotechnology, major ethical issues-other organ and tissue donation, biofuels, forensic use of bio information international collaboration.

ML 4204 Healthcare Marketing (01 Credits)

Introducing marketing and orientation towards marketing, Marketing environment and introduction to marketing research, Consumer market and consumer buying behaviour, Market segmentation and selecting target markets; Product strategy and new product development; Pricing strategies and programs; Distribution strategy, Marketing communications strategy. Strategic marketing, Ethics and social responsibility in health care marketing; Emerging issues in health care marketing.

ML 4205 Applied Statistics (02 Credits)

Additive and non-additive ANOVA models, Mean separation, incidence data and proportions, Odds and odds ratios, Models for proportions, Non-parametric methods for two-sample case; independent sample and paired observations, Non-parametric methods for data from designed experiments.

ML 4206 Research Project (06 Credits)

Search for and retrieval of information required such as conducting literature surveys, Identification and optimal utilization of available resources, Project execution, Ethical evaluation and safety evaluation when applicable, Follow the approved research methodology, Data collection & analysis, discussing the results, Making conclusions, Scientific dissertation writing according to the given format and presentation (oral) of the findings.

ML 4207 Human Resource Management (01 Credits)

Introduction to Human Resource Management, the role of human resource professionals, job analysis & Human Resource Planning, Employee Recruitment & Selection, Career management, Employee training, Employee development, Employee performance management, Compensation management, Emerging issues in Human Resource Management, Talent management.