Kingdom of Saudi Arabia
Ministry of Education
Jazan University

Faculty of Applied Medical Sciences

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المملكة العربية السعودية وزارة التعليم جامعة جازان كلية العلوم الطبية التطبيقية

COURSE DESCRIPTION FOR MLT

Course name: Introduction to Human Anatomy

Course Code: 220 Anat

Course description:

The following subjects will be included:

Introduction to major component of human body. Digestive system: anatomy. Cardiovascular system: anatomy of heart & blood circulation, Respiratory system: anatomy.

Renal system: anatomy of urinary system. Genital system male& female: anatomical structure. Endocrine glands: definition, pituitary gland (Thyroid, Adrenal, Pancreas, testes,

ovaries). Nervous system: brain& spinal cord, sympathetic and parasympathetic nerves. Skeletal and muscular system

- Introduction to the human body structural organization, anatomical terminology, terms of positions (directional terms), movement, body regions and cavities.
- The Digestive System:
 - A: The gastro-intestinal tract (GIT): mouth, pharynx, esophagus, stomach, small intestine (duodenum, jejunum, ileum) large intestine (appendix, caecum, ascending, transverse, descending colon), rectum and anal canal.
 - B: Accessory digestive glands: Salivary glands, pancreas, liver, gall bladder
- The Cardiovascular System
 - A: The heart: location pericardium -chambers valves
 - B: Principal arteries and veins of the systemic circulation
- The Respiratory System:
 - Nasal cavity, pharynx, larynx, trachea, bronchi, lungs and pleura
- The Renal System:
 - Kidney, ureter, urinary bladder and urethra
- The Genital (Reproductive) System:
 - A-Male genital system: testis, prostate and seminal vesicle glands- urethral (Cowper's) gland
 - B-Female genital system: ovaries-Fallopian tube-uterus- vagina
- The Central Nervous System
 - Meninges, cerebrum, brain stem, cerebellum, cranial nerves, spinal cord & spinal nerves
- The Endocrine System
 - The pituitary gland–thyroid & parathyroid and adrenal glands

- The Skeletal System:

A- Axial skeleton:

Skull: main cranial bones & facial bones.

Vertebral column (cervical, thoracic, lumbar and sacral vertebrae, sacrum & coccyx).

- Thorax (sternum, ribs).
- B- Appendicular skeleton:
- Pectoral girdle: Clavicle, scapula
- Upper limb: humerus, radius and ulna, carpals, metacarpals and phalanges
- Pelvic girdle: Differences between the male and female pelvis
- Lower limb: femur –patella tibia and fibula tarsals, metatarsals and phalanges
- Types of joints (fibrous, cartilaginous & synovial joints)
- The Muscular system –main types of muscles



Course name: Human Physiology

Course Code: 230 MLT

Course description:

This course is a requirement for the undergraduates of the second year of Medical Laboratory Technology. This course introduces the student to various bases of human physiology and theoretical concepts behind it. Students involved in this course are expected to; integrate knowledge base from the basic sciences theory courses, which will be necessary for understanding how the human body works. The course will cover all the major organ systems of the human body, including the gastrointestinal system, cardiovascular physiology, respiratory physiology, renal physiology, reproductive system, endocrinology and nervous system- pituitary gland (pituitary –thyroid- Islet of Langerhans).

Course contents:

Introduction: Structural and functional Organization of the Human & Homeostasis –feedback control

Membrane Potentials and Autonomic nervous system –

The Digestive System

The Cardiovascular System

The Respiratory System - Renal system

The Endocrine System and pituitary gland

Pancreas hormones and its action

Thyroid gland and its actions

Central Nervous System



Course name: Introduction to Ethics in the Health Professions

Course Code: 243 PHCL

Course description:

This interprofessional ethics course involves teaching of rudimentary knowledge and skills in ethical theory and reasoning, professional ethics, interprofessional approach to health care decision-making, goals of health care, illness experience, and other topics of concern.

- Introduction to Professional & Medical Ethics
- Health Care Providers duties toward their profusion, colleague and
- community
- Health Care Providers duties toward their patients
- Patients' Rights and Responsibilities
- Ethics of Financial Affairs in the Healthcare Field
- Privacy & Confidentiality
- Ethical Issues in Research
- Ethics of Dealing with Emergency Situations
- Ethics of Dealing with Life-Threatening and Incurable Diseases
- Ethics of Public Health & Health Promotion



Course name: General Biochemistry

Course Code: 201 HLT

Course description:

- 1. The course will prepare the students to understand the structure, properties, and functions of biological macromolecules (carbohydrates, proteins, lipids and nucleic acids).
- 2. Nomenclatures of enzymes and its functions and role in chemical reactions.
- 3. Study of functions of minerals and vitamins in the body.
- 4. Introduction to hormones and its functions.
- 5. Overview on bioenergetics and metabolism.

- Introduction to biochemistry
- Cellular organelles
- Acid base balance / Buffers
- Carbohydrates structure and function
- Amino Acids & Proteins structure and function
- Introduction to Enzymes
- Lipids structure and function
- Nucleic acids structure and function
- Introduction to vitamins
- Introduction to hormones
- Introduction to minerals
- Introduction to metabolism

Course name: Basic Microbiology

Course Code: 203 HLT

Course description:

Basic Microbiology course is designed for students with some background in biology whose career path intersect or involves dealing with microbes. This course introduces the basic principles of microbiology, examining the microbes that inhabit our planet and our body and their effects on individuals' health. Students will analyze the impact of microbiology on our lives and the means to control and understand microbial growth and spread.

Course contents:

Introduction to Microbiology and

Microorganisms

Safety rule in Microbiology laboratory and Instrumentations Microbial Taxonomy and

Classification

Microbiological media & preparation / Sterile and aseptic techniques Control of Microbial growth and spread.

Isolation of pure culture, Simple staining, and

Microscopy. Microbial structure

Special stain & Biochemical tests of Gram-

positive bacteria

Basic nutritional, Chemical and physical

requirements

Isolation and Identification of Gram-

Negative Bacteria

Normal Flora of human body

Microbial pathogenicity and opportunistic pathogen Isolation and Identification of fungi

Introduction to Parasitology and parasitic infections Isolation and Identification of Parasites

Food Microbiology & Food borne pathogens. Isolation and Identification of Bacteria / Fungi Host-Pathogen interaction.

Antibiotic Susceptibility Test

Antimicrobial agents

Course name: Histology Course Code: 231 MLT

Course description:

The course covers topics relevant to histological structure of four major types of tissues (Epithelial, connective, muscular and nervous tissues) and different body organ systems and the function of the epithelial lining of the different body system such as digestive system & respiratory system). As well as to teach the student the different practical diagnostic techniques used in histotechnology, histochemistry and cytotechnology.

- -- Tissue Decalcification
- Tissue processing
- Embedding and Microtomy
- Histological stains and Special stains
- Immunohistochemistry & Cytotechnology
- Histology of epithelial tissues and glands
- Histology of connective, muscle and nerve tissues
- Histology of respiratory system
- Histology of Digestive system



Course name: Basic Immunology

Course Code: 260 MLT

Course description:

It is an introductory course; this course is designed for students with limited background in immunology. It will discover the basic principles of immunology such as tissues and organs of the immune system. Furthermore, it will cover the development, activation, effector functions, and regulation of immune response. Moreover, this course will explore the use of immunological techniques as analytical tools in the clinical laboratory.

Course contents:

L-Basic concepts in Immunology

P- Laboratory Safety and Standard Precautions

P: Specimen preparation and Equipment used in Immunology laboratory

L: Innate Immunity: physical and mechanical barriers

P: Purification of WBCs Using Ficoll-Paque Technique 4

L- Complement

P- Antigen-Antibody Reactions.

P- Slide Agglutination Test - Qualitative Determination of C-Reactive

Protein (CRP).

L- Antigen Processing and Presentation part I

P- Slide Agglutination Test - Latex Agglutination Test for Toxoplasma

gondii.

L-Adaptive immunity: Cellular Immune response.

P-Slide and Tube Agglutination Test for salmonella

T= Theory P=Practical

L-Adaptive immunity: Cellular Immune response.

P; Slide and Tube Agglutination Test for salmonella 4

L-Cytokines

P: Main assessment (Students Presentations) 4

L- Adaptive immunity: Humoral Immunity: Antibody

Structures and

Functions

P- BENGAL ROSE Latex - Slide and tube agglutination test.

P: Flocculation Reaction Venereal Diseases Research Laboratory

(VDRL) Test.

L- Adaptive immunity: Humoral Immunity: Antibody

Structures and

P: ELISA –Enzyme-Linked Immunosorbent Assay.

P- ELISpot Assay

L- Adaptive immunity: Humoral Immunity: Antibody

Structures and

P: ELISA –Enzyme-Linked Immunosorbent Assay.

P- ELISpot Assay

Course name: Metabolic Biochemistry

Course Code: 211 MLT

Course description:

This course deals with the principle of bioenergetics, biological oxidation, and processing and utilization of energy in biological system. This course discusses about the metabolism of carbohydrates lipid, protein, nucleic acids, their related metabolic disorders and introduction of endocrinology.

- Bioenergetics and ATP
- Biological Oxidation
- Carbohydrates metabolism: Anabolism and Catabolism, Glycolysis and TCA cycle, HMP Pathway
- Carbohydrates metabolism: Glycogen metabolism Glycogenolysis, Glycogenesis, Gluconeogenesis
- Carbohydrate metabolism: disorders
- Lipid metabolism: Beta oxidation of fatty acids
- Lipid metabolism: Biosynthesis of fatty acids and its regulation.
- Lipid metabolism: Cholesterol breakdown and synthesis and its regulation
- Protein metabolism: Transamination and deamination, Ammonia transport
- Protein metabolism: Urea cycle and its integration with TCA cycle, Inborn error of amino acid metabolism
- Metabolism of Nucleotides: Biosynthesis and degradation of purine nucleotides
- Metabolism of Nucleotides: Biosynthesis and degradation of pyrimidine nucleotides and related disorders

Course name: General Pathology

Course Code: 232 MLT

Course description:

This course provides a comprehensive overview of human pathology with emphasis on basic disease patterns, etiology, and their underlying mechanisms. Topics included are general disease processes like cell injury, inflammation & neoplasia etc. Laboratory components provide the knowledge about gross and microscopic changes occurring as a result of disease processes in various organ systems.

- Introduction to pathology and cell injury
- Cell injury and death
- Disturbance of metabolism I
- Disturbance of metabolism II
- Disturbance of circulation I
- Disturbance of circulation II
- Acute Inflammation
- Chronic Inflammation
- Neoplasia
- Digestive system



Course name: Genetics and Molecular Biology

Course Code: 240 MLT

Course description:

In this course the students will be able to attain the basic details about the genetics and comprehend the fundamental processes of gene transmission, mutation, gene expression and regulation. In addition, this course introduces different types of mutations and explains the modes of inheritance that may lead to different types of genetic disorders and prenatal diagnosis of such genetic disorders. The pivotal role of genetics and epigenetics in the field of cancer and its diagnosis.

- -Structure and Replication of eukaryotic chromosome
- -DNA Replication
- -Transcription
- -Genetic Code and Translation
- -Gene Regulation
- -Transmission Genetics
- -Transposable Elements
- -Mutation
- -Cancer
- -Genomic DNA Isolation
- -Agarose Gel Electrophoresis
- -DNA Quantification and Karyotyping
- -Medical Genetics



Course name: Clinical Immunology

Course Code: 360 MLT

Course description:

This course is designed to provide skills necessary for critical analysis, hypothesis, and experimental methods on immunological disorders. This course is aimed to provide the critical role immunology can play in elucidating pathogenesis and how immunoassays can assist clinicians in the diagnosis, prognosis and selecting proper treatment plans of a given disorder. The course aims to cover several major immune disorders, focusing on immunopathogenesis, appropriate immunoassays and supported by several relevant case studies.

Course contents:

T: Principle of Immunization,

P: Flow-cytometry- Basic procedure, Preparation of samples-

Fluidics T: Tolerance

P: Immunofluorescence Assay(demonstration)

T: Immunodeficiency diseases

P: Western Blot

T: Hypersensitivity

P: Tuberculin skin test for Delayed hypersensitivity reaction

T: Autoimmune diseases

P: Determination of Rheumatoid Factor-Latex Agglutination

T: Immunodiagnostic tests of viral diseases

P: Detection of Anti Cardiolipin Antibody-ELISA –Confirmatory

test of SLE)

T: Immunodiagnostic tests of Bacterial disease

P: Treponema pallidum Hemagglutination Assay Test for the Serodiagnosis of Syphilis

T: Immunotherapy

P: Qualitative determination of plasma reagins (RPR-Carbon -

Slide Agglutination)

T: Immunotherapy

P: Qualitative determination of plasma reagins (RPR-Carbon -

Slide Agglutination)

T: Discussion

P: Determination Of Anti-Streptolysin 'O' Antibodies (ASO-

Latex Agglutination)

T=Theory. P=Practical



Course name: Infection Prevention and Control

Course Code: 336 IPC

Course description:

The course is developed with focus on preventing and controlling the hospital acquired infections (HAIs) in different health care settings. The student will learn how to reduce the burden of HAIs in Healthcare settings while giving healthcare services.

- 1. Introduction to HAIs Definition, problem statement, socioeconomic impact
- 2. Infectious disease epidemiology
- 3. Infection Control Program- roles and responsibilities of committee, Infection control program committee, role of staff in reducing HAIs, 4. Basic Principles in Environmental cleaning, disinfection and sterilization practices in health care settings
- 5. Prevention of nosocomial infections- Standards /Universal precautions
- 6. Preventing HAIs in healthcare workers Infections- Vaccination and post exposure prophylaxis.
- 7. Biomedical waste management Environmental control measures



Course name: Clinical Chemistry-I

Course Code: 310 MLT

Course description:

The course is one semester course of 3 credit hours (2 credit for theory lectures and one for practical sessions). Fifteen lectures are provided to the students, covering the diagnostic biochemistry principles and the different metabolic disorders of macromolecules in comparison to normal metabolism. Practical sessions are provided to enable students to describe important practical techniques used in clinical lab, with experiments that reinforce and complement the taught material to give interpretation of the results for both normal subjects and patients.

- Carbohydrate; metabolism, disorders and their clinical chemistry testing
- Plasma proteins; metabolism, clinical relevance and their clinical chemistry testing.
- Enzymes in clinical diagnosis
- Iron metabolism and measurements
- Introduction to Hormones and Pituitary Function
- Thyroid Function
- Endocrine Control of Calcium Phosphate and Magnesium and bone Metabolism
- Biomarkers for Bone disease

Course name: Clinical Microbiology I

Course Code: 321 MLT

Course description:

This course focuses on clinical microbiology. Morphology, classification, cultural and biochemical characteristics, pathogenicity (Pathophysiology), laboratory diagnosis, prevention and control of various bacteria and fungus are covered. The macroscopic and microscopic features, culture media required, biochemical reactions and other techniques required for identification of various bacteria and fungi are included. Identification of various Gram positive, and other bacteria will be covered according to various cases. Molecular mechanism of antibiotic resistance of various bacteria included.

Course contents:

Microbial genetics

Bacterial pathogenesis

Classification of pathogenic bacteria.

Staphylococcus

Streptococcus

Streptococcus pneumoniae

Corynebacterium and Bacillus anthracis:

Clostridium: Clostridium tetani, Clostridium perfringens,

Clostridium botulinum and Clostridium difficile.

Actinomyces, Mycoplasmas, Rickettsiaceae, Chlamydia

Introduction of mycology & Reproduction and sporulation of fungi

Candidiasis

Cryptococcosis

Aspergillosis, Penicillosis Pneumocystisjiroveci Mucormycosis,

Fusariumsolani,

Systemic mycoses

Otomycosis, keratomycosis and Mycotic poisoning



Course name: Molecular Diagnostic

Course Code: 440 MLT

Course description:

This course aims to upgrade the theoretical knowledge and practical skills of students in the field of molecular diagnosis. In addition, it seeks to prepare the students more efficiently to work in the field of molecular diagnosis or laboratories at the hospitals.

Course contents:

Introduction to Polymerase Chain Reaction (PCR)

Real Time PCR

Overview of Restriction enzyme

Introduction to Cloning vectors

Introduction to Recombinant DNA Technology

Restriction fragment length polymorphism (RFLP)

Ligation

Introduction to Hybridization

Bio-informatics



Course name: Clinical Chemistry-II

Course Code: 311 MLT



Course description:

The course contents include the study of -

(i) functions of various organs in the human body. (ii) related disorders/diseases and (iii) related laboratory diagnostic methods for the assessment of the functions/diseases and their clinical interpretation in the practical.

Course contents:

Unit 1: Liver function (Week 1-3)

Unit 2: Gastric function (Week 3)*

Unit 3: Cardiac function (Week 4)

Unit 4: Renal Function and non-protein nitrogen (Week 5-6)+

Unit 5: Blood gas and acid-base balance (Week 7)

Unit 6: Adrenal hormone (Week 8)

Unit 7: Reproductive function (Week 9)

Unit 8: Biochemistry of Cancer and its Biomarkers (Week 10)*



Course name: Fundamental of Biostatistics

Course Code: 222 STA

Course description:

The purpose of this course is to familiarize students with the basics of biostatistics topics based on sources, scope, collection, classification, and presentation of descriptive data; Probability; Sampling; Inference; measures of population and vital statistics, Research with Statistical Package. The course will empower students to write statistical part of, data collection and statistical analysis plans for grants, enable to read most of the relevant health related literature with understanding of the statistical content, publications and to organize results in appropriate visual displays or tables.

Hence forth, it revolves on the application of basic techniques as well as main concepts of inferential statistics.

- Introduction to Biostatistics
- Definitions & Common terms used
- Notations used in Biostatistics
- Application and Uses of Biostatistics as Science and Figures
- Sources of data
- Types of Data- Qualitative and Quantitative Data,
- Presentation of Quantitative and Qualitative Data
- Measures of Location Average and Percentiles
- Measures of Central Tendency Averages, Mean, Median and Mode, Measures of Location Percentiles
- Variability and its Measures
- Normal Distribution and Normal Curve, Relative or Standard
- Normal distribution, Asymmetrical distribution Problems
- Sampling characteristics and techniques, probability (chance), sampling variability and significance tests of significance
- Significance of difference between two means and proportions, 't' test, Chi-square test
- Correlation and Regression
- Measures of Population and Vital Statistics
- Introduction to SPSS. Installing SPSS.

Course name: Research Methodology

Course Code: 352 GSC

Course description:

This course offers an overview of research methodology including basic concepts employed in quantitative and qualitative research methods. This includes identifying and justifying the research problem, formulating achievable research objectives, reviewing the literature, specifying the appropriate study design, designing of the study questionnaire, identifying study population and sample size estimation, identifying methods of data collection, understanding the highest standards of research ethics, statistical analysis, interpretation and dissemination of the results.

- Introduction to Scientific Research: Definition of research, Criteria for good research, Steps of the research process from idea to outcome, Characteristics of research, Types of research.
- Research Problem: Definition of the research problem, Criteria for research problem, Formulating research problem, Research Priorities
- Review of Literature: Define the literature review process, Purpose of a literature review, Types of literature reviews, State-of-the-art, Sources of literature review, Common mistakes to avoid, Approaches.
- Research Objectives and Hypotheses: Formulation of achievable objectives for the research project, Define and describe the difference between general and specific objectives, characteristics of research objectives
- Study Design: Different study designs, Observational & Experimental: cross-sectional, case-control, cohort, clinical trial, experimental animal model.
- Sampling: Sample size calculation, Sampling strategies, Sampling technique
- Methods of Data Collection: Types of Data, Data Quality Assurance, clinical, fieldwork, in-vivo, in-vitro, questionnaire design, laboratory methods, measurements, data gathering, etc
- Data analysis, Interpretation & Reporting:
- Type of analysis, Software, Descriptive analysis, Inferential analysis,
- Measures of frequency, relationship & associations, Measures of risk,
- Tables, Figures, Maps,
 - Important Topics in Research:
- Research Ethics, human, animal, genomic materials, ethical approval
- Evidence-Based Medicine, decision making, meta-analyses, systematic reviews, randomized controlled trials Plagiarism, definition, types, detection, consequences.

Course name: Clinical Chemistry-II

Course Code: MLT311

Course description:

The course contents include the study of -

(i) functions of various organs in the human body. (ii) related disorders/diseases and (iii) related laboratory diagnostic methods for the assessment of the functions/diseases and their clinical interpretation in the practical.

Course contents:

Unit 1: Liver function (Week 1-3)

Unit 2: Gastric function (Week 3)*

Unit 3: Cardiac function (Week 4)

Unit 4: Renal Function and non-protein nitrogen (Week 5-6)+

Unit 5: Blood gas and acid-base balance (Week 7)

Unit 6: Adrenal hormone (Week 8)

Unit 7: Reproductive function (Week 9)

Unit 8: Biochemistry of Cancer and its Biomarkers (Week 10)*



Course name: Clinical Microbiology II

Course Code: 322 MLT

Course description:

This course focuses on clinical microbiology that is related to Gram-negative bacteria. Presents the terminology, epidemiology, disease processes and bacterial pathogenesis. The macroscopic and microscopic features, required media, biochemical reactions and other techniques required for identification of the organisms are also included. Acid fast bacteria and other bacteria including identification of structures, transmission, and associated diseases are also covered in this course.

- Classification of gram negative and bacteria pathophysiology
- Enterobacteriaceae
- Pseudomonas and Related Bacteria
- Vibrio and Related Bacteria
- Campylobacter and helicobacter:
- Spirochetes.
- Neisseria and Related Genera
- Haemophilus and Related Bacteria
- Mycobacterium and Related Acid-Fast Bacteria
- Mycoplasma and Ureaplasma
- Non-Spore-Forming Anaerobic Bacteria
- Legionella



Course name: Hematology I Course Code: 350 MLT

Course description:

This course enables the students to explain the basic concepts of plasma and cellular components of blood and their functions, hemopoiesis, erythropoiesis and morphology of red cells and describe various red cell disorders and their laboratory diagnosis.

Course contents:

Introduction to hematology,

Structure and functions of blood

Hematopoiesis

Erythropoiesis and its regulation

Hemoglobin; structure, functions, types, degradation

Morphology of red cells

Anemia, classification, clinical features, laboratory diagnosis

Microcytic and hypochromic anemias

Macrocytic anemias

Hereditary disorders of hemoglobin

Hereditary hemolytic anemias

Acquired hemolytic anemias

Microangiopathic hemolytic anemia

Paroxysmal nocturnal hemoglobinuria

Aplastic anemia

Polycythemia

Course name: Clinical Parasitology I

Course Code: 323 MLT

Course description:

The course deals with the common protozoan parasites infecting man and the medically important arthropods that transmit diseases and/or act as agents of diseases. The course covers the detailed morphology of each protozoan parasite and the different methods and procedures used for diagnosis. As well, the course covers the biological and clinical aspects of protozoan parasites and their vectors, the geographical distribution, the concepts of epidemiology and prevention and control.

Course contents:

- General introduction to parasitology

- Classification of parasites

- General characters of protozoan parasites. Classification of protozoan parasites infecting man. - Intestinal amoebae (pathogenic).

Intestinal amoebae (non-pathogenic) (E-learning) Free-living amoeba: Naegleria & Acanthamoeba. Bastocystis hominis (E-learning)

- Intestinal and urogenital flagellates:

Giardia lamblia & Trichomonas.

- Intestinal coccidia:

Cryptosporidium, Cyclospora, Cystoisospora

-Ciliates: Balantidium coli (E-learning)

-Classification of medically important arthropods,

Mosquitoes, Sandflies, Myiasis

Mites: Sarcoptes scabiei, scabies- Mites: House dust

mite allergy. Pediculosis, tick paralysis

-Blood and Tissue flagellates:

Leishmania Trypanosomsa

Malaria Plasmodium species 3

Toxoplasma gondii



Course name: Research Writing

Course Code: 353 GSC

Course description:

By the end of this course students will be:

- 1- Able to write and match the factors related to different sections of research proposal.
- 2- Able to present the results and findings in proper tables, figures and illustrations.
- 3- Able to overcome the issues related to writing, citing & format of references used in research reports.
- 4- Interpret and disseminate of the results and findings.
- 5- Able to develop research proposal according to the university norms.

- Introduction and how to write abstract
- How to write introduction
- How to write Materials and methods section
- Ethics in medical research
- Writing results section
- Data Analysis
- Discussion of a scientific research paper
- Critical appraisal of an article
- Additional material-Sample research proposal with comments
- Additional material- A Systematic Approach—How to Write Your Introduction
- Additional material-Guidance on university proposal

Course name: Urine analysis and body fluids

Course Code: 312 MLT

Course description:

This course deals with the topics that cover the basic knowledge of the physiological, pathological characteristic and biochemical components of urine and body fluids. The course also teaches the student how to perform experiments for the analysis of urine and body fluids samples and how to interpret the results. In addition, the course demonstrates the professional and teamwork ability for the students.

- Urine and calculi analysis
- Peritoneal fluid
- Cerebrospinal fluid
- Synovial fluid
- Pericardial fluid
- Pleural fluid
- Amniotic fluid



Course name: Molecular and Cellular Pathology

Course Code: 330 MLT

Course description:

This course is the study of structural and functional changes in cells, tissues and organs that describe disease at a molecular level. Moreover, it describes molecular basis of cellular interaction, growth, proliferation, apoptosis, inflammation, and oncogenesis. In addition, how to apply several molecular techniques in cellular pathology to provide an accurate diagnosis.

- Introduction to Molecular Pathology
- Understanding Human Disease in the Post-Genomic Era
- Cell signaling and communication
- Cell death and regulation
- Molecular and cellular mechanisms of cancer
- Molecular oncology: Hallmarks of cance
- r Molecular pathology of Inflammation immunology
- Senescence and aging
- Epigenetics and Gene regulation
- Stem cell and developmental biology



Course Code: 351 MLT

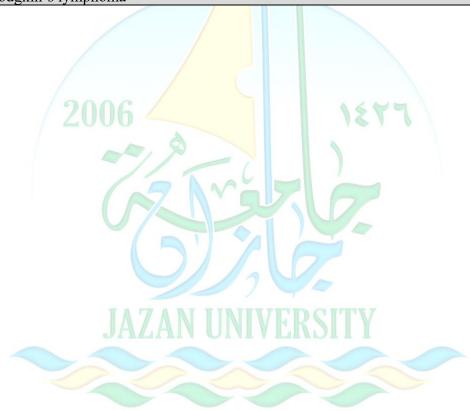
Course description:

This course enables the students to:

A course that consists of lectures and demonstrations in hematology with emphasis on hematological disorders associated with white blood cell abnormalities and anomalies, cell identification, cell differentiation and cell morphology evaluation procedures.

- Hematopoietic stem cell and Hematopoiesis
- Leukopoiesis part 1
- Types and importance
- Granulopoiesis and function of granulocytes
- Leukopoiesis part 2
- Lymphopoiesis and function of lymphocytes
- Monopoiesis and function of monocytes.
- Nonmalignant (benign) disorders of leukocytes (part 1)
- Benign disorders of granulocytes.
- Nonmalignant (benign) disorders of leukocytes (part 2)
- Benign disorders of Lymphocytes and Monocytes.
- Malignant disorders of leukocytes; an overview
- Introduction to leukemia
- T. Acute leukemia: 1. Acute myeloid leukemia;
- FAB classifications
- Acute leukemia: 2. Acute myeloid leukemia
- WHO classifications (an overview) and laboratory diagnosis of AML.
- Acute leukemia: 2. Acute lymphoblastic leukemia
- Chronic leukemias
- Chronic myeloid leukemia;

- Chronic leukemias
- Chronic lymphocytic leukemia
- Non leukemic myeloproliferative disorders
- Myelofibrosis with myeloid metaplasia.
- Non leukemic myeloproliferative disorders
- Multiple myeloma
- Lymphoproliferative disorders
- Myelodysplastic syndromes
- Lymphoproliferative disorders
- Hodgkin's and non-Hodgkin's lymphoma



Course name: Clinical Parasitology II

Course Code: 421 MLT

Course description:

The course deals with human parasitic diseases caused by helminthes. The course covers the diagnostic morphology of parasitic worms particularly the diagnostic stages of each parasite and the different methods and procedures used for diagnosis. Also, the course covers the biological and clinical aspects of helminthes infections, the geographical distribution, the concepts of epidemiology, prevention, and control.

Course contents:

General characters of Nemathelminthes Intestinal nematodes

Tissue nematodes: Trichinella spiralis

Filarial nematodes.

General characters of Cestoda

Intestinal and tissue cestodes

Classification of helminths

General characters of Platyhelminthes and Trematoda Hepatic flukes

Intestinal flukes

Lung Flukes

Blood Flukes



Course name: Clinical Coagulation

Course Code: 352 MLT

Course description:

This course is designed to provide the student with in-depth knowledge of hemostasis, pathogenesis, laboratory investigations of hemostatic disorders and laboratory practices related to hemostasis.

- Introduction to hemostasis
- An overview of hemostasis
- Major components of normal hemostasis
- Primary hemostasis vs Secondary hemostasis
- Vessel wall
- Role of vascular endothelium in hemostasis
- Platelets
- Coagulation cascades
- Positive feedback loop of thrombin
- Overview of cell-based model of hemostasis
- Physiological inhibitors of blood coagulation
- Tissue factor pathway inhibitor
- Fibrinolysis and wound healing
- Thrombophilia
- Screening procedures for thrombophilia
- How to screen for hemostatic disorders:
- Introduction to hemostatic disorders:
- The clinical distinction between disorders of vessels, platelets and disorders of blood coagulation
- Vascular disorders
- Platelet disorders
- Congenital platelet disorders
- Acquired platelet disorders
- Coagulation disorders

Course name: Clinical Virology

Course Code: 420 MLT

Course description:

This course extends the coverage of microorganisms to include viruses and it has two part introductory and proficient part of virology topics that include structure, classification, pathogenesis, laboratory diagnosis, prevention and therapy of clinically relevant viral infections.

Course contents:

1.Course Introduction

Introduction to viruses, classification of viruses, and viral Replication 2. Viral Pathogenesis and host immune responses to viruses

- 3. Bacteriophages
- 4. Respiratory System Viruses
- 5. Nerves System Viruses.
- 6. Gastroenteritis Viruses
- 7. Hepatitis viruses
- 8. Arboviruses
- 9. Oncogenic, oncolytic Viruses and the use of viruses for gene therapy 10. Vaccines and Antiviral Agents for viral diseases
- 11. Emerging viruses



Course name: Quality Assurance and laboratory Management

Course Code: 401 MLT

Course description:

This course covers the principles of clinical laboratory quality management. It introduces the global concept of organizational structure followed by discussions of laboratory leadership, management functions, managerial problem-solving, decision-making strategies, and process improvement. It also covers the importance of statistical quality control, and how to analyze the control charts.

Course contents:

Introduction to the Quality Management in the Clinical Laboratory.

Internal QC – Laboratory Statistics and Quality Control for Quantitative tests

Internal QC – Levey-Jennings Charts and Westgard Rules for Quantitative tests

Internal QC – Quality Control for Qualitative and Semi-quantitative Tests (Self- Learning)

Internal QC – Method Validation of Quantitative Test

Internal QC - Basic Validation of Qualitative Tests (Sensitivity, Specificity, and Predictive Value)

External Quality Assessment (Self-Learning)

Quality Assurance documents and records (Self-Learning)

Organization and Principles of Clinical Laboratory Management H

Human Recourse Management

Operations and Information Management

Financial Management of the Clinical Laboratory (Self-Learning)

Course name: Advanced Topics in Medical Technology

Course Code: 402 MLT

Course description:

The course contents include study of advanced techniques that are used in modern diagnostics in various areas, , such as in Molecular Biology, Immunology, Biochemistry and Microbiology.

Course contents:

Introduction to Modern diagnostics

Flow Cytometry

Immunohistochemistry (IHC)

Gene Editing Technology

Tissue and cell culture methods

DNA Sequencing in diagnostics

Introduction to Biosensor

Single Nucleotide Polymorphism



Course name: Toxicology and Forensic Science

Course Code: 441 MLT

Course description:

Basic and advanced topics relevant to toxicology and forensic science are reviewed with an emphasis on understanding of concepts and application of emerging methods, strategies, and organization of analytics in the field of clinical chemistry and clinical toxicology laboratories

- Introduction to Pharmacology.
- Types of drugs.
- Classification and actions.
- Drug Biotransformation.
- Drug Pharmacokinetics.
- Drug Pharmacodynamics
- Drug Pharmacogenesis.
- Introduction to Therapeutic Drug Monitoring (TDM).
- Introduction to toxicology.
- Effects of toxic chemicals on specific organ systems.
- Diagnosis of poisoning, prevention of further absorption or exposure.
- Environmental toxicants.
- Types, sources, and effects.
- Toxicity of Heavy Metals.
- Toxicity of pesticides.
- Substance of abuse.
- Introduction to Forensic Sciences.
- Crime Scene.
- Blood stain examination.
- HLA system.
- DNA finger printing.
- Paternity investigation.
- Doping in sports.

Course name: Blood Bank and Transfusion Sciences

Course Code: 450 MLT

Course description:

This course provides a comprehensive knowledge of the antigen-antibody reactions, blood groups systems, theoretical and practical aspects of blood bank procedures. This course also describes transfusion reactions, hemolytic disease of the newborns, donor blood and blood components, quality assurance of system in the blood banks.

Course contents:

Fundamentals of Immunology for Blood Bankers

The ABO Blood Group system and ABO blood grouping discrapencies.

The RH Blood Group System and Other blood group systems

Donor selection and Blood component preparation

antiglobulin test Pre-transfusion testing

Antibody screening test.

cross-match discrepancies.

Antibody identification test.

Human Platelets Antigens and human Neutrophil Antigens.

Hemolytic disease of the fetus and newborn

Adverse effects of blood transfusion and transfusion-transmitted diseases.

Immune hemolytic anemia

Quality control in the blood bank.

Stem cell and organ transplantation.

Course name: Clinical Practice of Molecular Genetics

Course Code: 442 MLT

Course description:

In this course the student will be able to attain the basic details about the study of molecular diagnostic techniques that are used in the genetic diagnostics laboratories in various areas of genetic diseases.

Course contents:

Introduction to clinical practice in molecular diagnostics

DNA Extraction manual & automated

PCR (Different types)

Gel electrophoresis

qRT-PCR results interpretations

Medical genetics I

Medical genetics II



Course name: Clinical Practice in Microbiology

Course Code: 422 MLT

Course description:

Clinical Practice in Microbiology is an advanced course of correlating disease outcomes with sample collection and handling, detection, characterization, and quantification of microbes from patients in order to enable diagnosis, management and treatment of infectious diseases.

Course contents:

T: Introduction to Clinical Microbiology, Sample Collection

P: Laboratory safety and Demonstration of Different Media used in Microbiology Lab

T: Clinical symptoms and Laboratory diagnosis of Upper Respiratory Tract Infection

P: Examination of Upper respiratory Samples (Throat and sputum)

T: Clinical symptoms and Laboratory diagnosis of Lower Respiratory Tract Infection

P: Examination of lower respiratory Samples (sputum)

T: Clinical symptoms and Laboratory diagnosis of Skin and wound infections P: Microbiological Examination of skin and wound infection

T: Clinical symptoms and laboratory diagnosis of GIT Infection

(Bacterial and parasitic infections)-I

P: Bacteriological of stool analysis and stool culture

T: Clinical symptoms and Laboratory diagnosis of Ocular infection

P: Examination of sample for different viral diseases and viral markers

T: Clinical symptoms and diagnosis of CNS

P: Microbiological Examination of CSF

T: Clinical symptoms and diagnosis of STD (Genital Infection)

P: Serological examination of Various samples

T: Clinical symptoms and Laboratory diagnosis of Blood infections (Bacterial, fungal and Parasitic infections)-I

P: Isolation and Identification of blood borne pathogens

T: Clinical symptoms and diagnosis of UTI

P: Urine collection and its bacteriological analysis of urine culture T= Theory

P= Practical and hospital visits

Course name: Clinical Practice in hematology

Course Code: 451 MLT

Course description:

This course helps the students to interpret laboratory data of various anemias, leukemias, and hemostatic disorders. The curriculum also develops approach towards the diagnosis of hematological disorders. Practical aspects enable the students to report the abnormal peripheral blood smear findings and suggests further evaluation in cases of abnormal findings.

Course contents:

Interpretation of complete blood count report

Microcytic and hypochromic anemias; Iron deficiency anemia, thalassemia, sideroblastic anemia, and anemia of chronic disorders; Case studies

Macrocytic anemias; Megaloblastic anemia, Pernicious anemia; Case studies

Normocytic and normochromic anemias; Aplastic anemia, bone marrow failure

Leukoeryhtroblastic blood picture; Case studies

Sickle cell anemia and sickle cell with other hemoglobinopathies

Hemolytic anemia and red cell fragmentation syndromes; G6PD deficiency anemia, Disseminated intravascular coagulation (DIC),

Thrombotic thrombocytopenic purpura (TTP), Microangiopathic hemolytic anemia (MAHA), Immune hemolytic anemia (IHA),

Hereditary spherocytosis (osmotic hemolysis); Case studies

Acute myeloid leukemia, Acute lymphoblastic leukemia; Case studies

Chronic myeloid leukemia, chronic lymphocytic leukemia; Case studies

Hereditary and acquired bleeding disorders; Case studies

Hereditary and acquired coagulation disorders; Case studies

Thrombophilia; case study

Course name: Clinical practice in clinical chemistry

Course Code: 410 MLT

Course description:

This course deals with the topics that cover the role of clinical chemistry in medicine and application of the lab experiments for the analysis and interpretation of biochemistry tests. It is also aimed to improve lab skills techniques required for clinical chemistry and maintain the quality control and quality assurance.

- Specimen consideration and managements in clinical lab
- Quality Control and Quality assurance in the clinical chemistry lab
- Analytic Techniques and Instrumentation
- Metabolic diseases (DM, ...)
- Study profile of Cardiac disease
- Study profile of the liver disease
- Study profile of the renal disease
- Body fluids
- Study profile of endocrinopathy
- Comprehensive case study