



Jinan University of Lebanon

Faculty of Public Health



Course Descriptions for the Undergraduate Medical Laboratory Technology Program 2022/2023

Remedial Courses

BIO100 Introduction to Biology

This course is designed to introduce freshman students to key biological concepts that is fundamental to animal biology. The topics include: biological history; structure and function of cells; cell division; reproduction; respiration; nervous system; immune system; genetics and heredity of population; protein synthesis and evolution.

CHE100 Introduction to Chemistry

This introductory course is designed to assist the students in developing the fundamental concepts for the most elementary ideas of chemistry.

University Required Courses

ADM105 Introduction to Information Technology

Topics include the Internet; computer hardware; operating systems and application software; multimedia; network communication; personal, social, and ethical issues. Systems and application software; multimedia; network communication; personal, social, and ethical issues.

LIT105 Arabic Civilization

This course introduces the overall concepts of civilization and the most important factors that contributed to the emergence of Islamic civilization. It also encompasses the main characteristics of the Islamic civilization with particular focus on the human dimension. Manifestations of Islamic civilization in policy, management, economy, society, and sciences are emphasized; topics discussed include: the Caliphate, the Ministry, the Emirate, tax calculations, the judiciary, the mandate of grievances, the police, government bureaus, the treasury, mail department, the army, the navy, women's rights and contributions, intellectual life, sciences, technological manifestations, and others. The impact of Islamic civilization in the European Renaissance and the reasons for the decline of civilization and ways to address them are also discussed.

LIT110 Arabic Language I

The primary aim of this course is to familiarize the students with correct writing styles, to avoid linguistic and spelling errors, to use proper punctuations, and to master various correspondence styles. The course also discusses the main principles of Arabic grammar through selected texts, spelling rules, writing paragraphs about subjects related to the selected texts, summary techniques, punctuations, rules of number spelling, common linguistic errors, titles, Curriculum Vitae editing techniques, methods of writing minutes of meetings, and administrative correspondences.

LIT113 Research Methodology I

This course aims at the development of a scientific orientation in the solution of educational problems. This course develops students' skills in identifying and developing research problems dealing with a variety of research designs. Basic statistical concepts are included.



LIT114 Research Methodology II

This course aims to cover what the activity of research is, how to proceed, how to measure progress, and what constitutes success. Students must understand the research process and the rules that guide it. It provides students an overview of qualitative and quantitative methods, data collection, recording and analysis and final output of a research proposal. It also provides students with tools to look at things objectively, develop critical and scientific attitude, as well as disciplined thinking to observe objectively and finally, skills of research particularly in the age of information. By the end of this module students should be in a position to prepare and carry out a small research proposal within a three month project.

LIT120 English Language I (or French Language I)

This is a study skills course that aims at developing potential teacher's proficiency in the skills of test taking, studying, word attacking, paraphrasing, restating and handwriting.

LIT125 English Language II (or French Language II)

This course aims at helping potential teachers extend their knowledge of vocabulary and grammar, as well as develop their oral/aural language proficiency through watching videos, conducting role-plays, simulations, and interviews, as well as presenting reading materials (of various sources: the internet, newspapers, magazines, and so on).

Faculty and Major Required Courses

MLT212 Histology Lab

This practical course deals mainly with the structural and functional relationships of various cells, tissues, and organs. Applied methods include preparation of tissues for microscopy and special staining techniques.

MLT224 Principles of Epidemiology

Epidemiology is the study of diseases from a population-based perspective; it involves the factors affecting disease rates and the distribution of disease and disabilities in populations. As a fundamental science of preventive medicine and public health, epidemiologic research has traditionally focused on questions of disease causation through population studies for both infectious and chronic diseases. The range of topics now addressed by epidemiologic methods includes health promotion, disease prevention, and assessing the quality of health care.

MLT232 Immunohematology

This course covers the subjects of blood group antigens and antibodies, the processes of quality testing, quality control, and basic laboratory techniques and safety. This course also overviews the principles, clinical significance, and practice of a wide variety of procedures applied during donor selection, component preparation and use, and the detection of antigen/antibody reactions. Topics covered during the course also include: donor screening, preparation of components, antigens and antibodies of the ABO, Rh and other blood group systems, pretransfusion testing procedures, hemolytic disease of the fetus and newborn, neonatal and obstetrical transfusion practice, and adverse effects of transfusion.



MLT233 Hematology Lab

This course offers a practical overview of the studies of cytology and physiology of blood, immunohematology, and homeostasis.

MLT239 Parasitology Lab

This practical course encompasses the study of major medical parasites and their hosts. During this course the student is expected to identify the characteristics, life cycles, pathogenicity, and testing methods for various relevant organisms. Life cycles, modes of transmission, and diseases will also be discussed as they pertain to patient health and risk factors. Applied methods include testing fecal, blood, urine and other body fluids with emphasis on the commonly used direct and indirect procedures and biochemical stains.

MLT252 Serology Lab

This practical course offers a technical training on the immunological techniques commonly applied in medical laboratories. Laboratory procedures aim at the basic understanding and knowledge of immunology and related instrumentation and techniques. The student will perform routine and special procedures such as: Precipitation, agglutination, and Coombs tests; immunodiffusion, immunoelectrophoresis and immunofluorescence techniques; Western blot, ELISA, RIA, IF; syphilis and viral detection. The student is also expected to correlate disease conditions with laboratory results.

MLT257 Medical Bacteriology

This course aims to equip participants with the skills and knowledge to identify common bacterial pathogens including gram positive and gram negative cocci, aerobic gram positive Bacilli, facultative gram positive Bacilli, strict aerobic and strict anaerobic Bacilli, Mycobacteria, and spirochetes. The course provides a logical framework to develop knowledge for the diagnosis of bacterial infections from various types of specimens (urine, stool, CSF, pleural fluid, wounds, and blood).

MLT259 Antibiotics

This course brings a comprehensive understanding of the biology and chemistry of antibiotics and addresses fundamental questions and problems concerning antibiotics. Students are introduced to the role of antibiotics in nature, how they are synthesized, their modes of action, and how to overcome problems with antibiotic resistant micro-organisms. The course also provides insights about bacterial physiology as well as clinical aspects of antibiotics and about evolution of antibiotic resistance.

MLT307 Techniques in Genetic Diagnosis

Basic concepts of modern laboratory diagnostic techniques. Isolation and purification of nucleic acids, PCR, Southern, Northern and Western blotting, cytogenetics, sequencing, microarray technology, and cloning. Current advances in diagnostic medicine using genetic polymorphisms as well as gene expression signatures to classify tumors for disease diagnosis and prognosis. Overview of currently available diagnostic tests their significance, and the technologies and instrumentation involved. Preimplantation and prenatal diagnosis methods, laboratory safety, diagnostic laboratory accreditation, quality control, and quality assurance.



MLT331 Practicum

This internship course provides nearly 500 hours of specialized clinical training in various health-care organizations. Students are supervised in private laboratory sections including microbiology, bacteriology, parasitology, hematology, blood banking, serology, chemistry, biochemistry, and other fields of practice. Students are asked to perform tests routinely done in these areas of clinical laboratory. Students shall also experience DNA diagnostics for human profiling and genetic disease characterization. The skills acquired from this training enable students to appreciate legal and ethical conduct, safe practical testing, and teamwork skills communication.

MLT336 Anatomy-Pathology

The Purpose of the course on anatomical pathology is to study the structural bases of diseases, and their etiology and pathogenesis for a better understanding of theoretical bases of medicine. The procedures used in anatomic pathology include: gross examination, histopathology, immunohistochemistry, cytopathology, tissue cytogenetics.

NURS361 Quality Management and Accreditation

This course provides an overview of the principles, practices, and application of quality systems in health care organizations. It provides the knowledge on quality improvement and accreditation processes to improve skills of future health professionals. In addition, it discusses the mechanisms for effective preparedness and implementation of accreditation standards in hospitals.

PHE133 Cell Biology for Health Sciences

This course introduces the student to the organization of living systems, energy transfer, continuity of life, biodiversity and classification of living things. The topics include: structure and functions of cells and cellular organelles, cell division, cellular respiration, photosynthesis, DNA structure and function, protein synthesis and heredity. It also includes an introduction to viruses and prokaryotes.

PHE136 General Biochemistry

Concepts of matter, composition of energy, elements, the atom, molecules and compounds, mixtures and solutions, chemical bonds, types of chemical bond and forces, chemical reactions, organic chemistry, functional groups, inorganic and organic compounds, water, salts, acid, base and buffer, carbohydrates, lipids, proteins, and nucleic acids.

PHE138 General Biochemistry Lab

The biochemistry laboratory course is designed to introduce students to modern techniques used in biochemical research. This course will provide students with the basic foundation of biochemistry concepts that will be required for the pursuit of their academic and career objectives. At the end of this course, the student should be able to explain basic scientific concepts relating to the study in the laboratory of the following areas of biochemistry.

PHE140 General Microbiology

This microbiology course explores the biology of microorganisms. Major areas to be covered include microbial cell structure and function, physiology, metabolism, genetics, diversity and ecology. Applied aspects of microbiology will also be covered, such as biotechnology, the role of microorganisms in environmental processes, and medical microbiology.



PHE142 General Microbiology Lab

The laboratory is set up to familiarize the student with the techniques necessary to grow and identify microorganisms. It covers basic techniques of media preparation, pure culture techniques, isolation of bacteria from different sources, staining of bacteria and microscopy, bacterial count, and also recognition and differentiation of microbial characteristics in culture. A series of laboratory exercises designed to provide a practical understanding of the microbial identification based on metabolic differences and molecular biology tools will also be performed.

PHE146 Organic Chemistry I

Nomenclature. Stereochemistry. Chemical reactivity and molecular Structure. Substitution, elimination, addition reactions. Spectroscopy: IR, UV, MN.

PHE148 Organic Chemistry I Lab

This course introduces the students to basic techniques and procedures to isolate, purify, and to characterize organic compounds and simple reactions used in the organic laboratory. The student will also be trained on the proper practices to write a scientific laboratory report.

PHE165 General Chemistry

Atomic structure, chemical bonding, gas laws, solutions, chemical equilibrium and other basic concepts.

PHE206 Anatomy

This course presents a systemic approach to the study of the human body. Students will first begin to learn the basics of anatomical terminology and, plane sections, with an overview of cellular processes and tissue classification. Students then are introduced to the gross and microscopic anatomy of the following systems: skeletal, muscular, circulatory, respiratory, digestive, urinary, reproductive, nervous and integumentary systems. This course is reinforced by the use of models, histological slides, skeletal materials and, at least, one time demonstration of an animal dissection.

PHE211 Histology

This course has been designed to provide students with the study of the fine structure of the cell and the extracellular matrix as well as the study of the basic tissue types (i.e., epithelial, connective, cartilage, bone, muscle and nervous tissue). Light microscopic analysis of tissue sections on slides will also be emphasized to teach students how the cellular organization of organs enables them to perform their specific functions.

PHE216 Physiology

This course has been designed to provide graduate students with an introduction to human physiology. It takes the basis of physiological processes governing each organ and system and their integration to maintain homeostasis of the entire organism. Course content will include Acid-Base Balance, Neural and Hormonal Mechanisms Control as well as study of the Circulatory, Digestive, Respiratory, Urinary, Lymphatic, Musculoskeletal and Endocrine Organ Systems. An overview of the anatomic structure of each functional organ will be briefly described due to the close interrelationship between structure and function in biological systems: anatomy, the study of form, and physiology, the study of function, are intrinsically related. Exercise physiology, the body's response to exercise, and long-term adaptation will be also covered.



PHE227 Hematology

This course encompasses the concepts of hematology including blood-forming organs and the origin and function of blood cells and plasma. It also covers the theoretical and clinical aspects of normal and pathological conditions of erythrocytes, leukocytes, platelets, coagulation, blood group systems, and basic therapeutic interventions.

PHE238 Parasitology

This subject encompasses the study of parasites, their hosts, and the relationship between them. Students will learn in this course about parasites that infect humans and animals, the diseases caused by them, clinical picture and the response generated against them. It is also concerned with the various methods of their diagnosis, treatment and finally their prevention and control. This course deals normally with protozoa and metazoa, while, the study of prokaryotes falls under the field of bacteriology rather than parasitology.

PHE239 Bioinformatics

Information technology and management in health care. Data retrieval from public and private data banks to synthesize previous professional experience with current learning for professional development. The Human Genome Project: History, ethics, revelations, and medical implications. Organization of the human genome and comparison with other organisms. Genomic databases and web resources (genbank, protein data bank, OMIM, molecular biology databases). Finding genes and relation to diseases, finding functional and regulatory motifs, protein sequence motifs, designing PCR primers.

PHE241 Mycology

Morphology, classification, distribution, etiology, transmission, clinical aspect, diagnostic, treatment of mushrooms, and dermatophytes.

PHE246 Immunology

The course aims at providing a global understanding of the immune system, its functions and dysfunctions. It introduces the cellular actors of the immune system and details their effector functions during host-pathogen interactions in both innate and adaptive responses. The course gives also an overview of diseases mediated by dysfunctions of the immune system and review different manipulations of immunity leading to the enhancement of host protective responses. As this course is dedicated for Medical Laboratory Technology students, principles of essential laboratory immunological tests will be also discussed.

PHE251 Serology

This course offers an overview of the immunological techniques commonly applied in medical laboratories. It also enables the student to learn specialized occupational theories, skills, and concepts commonly adapted in medical immunology laboratories. Typical workflow patterns, preventative maintenance, Quality Control, and general laboratory policies will be addressed.

PHE258 Medical Bacteriology I Lab

This practical course focuses on the identification of the bacteria present in samples such as urine, stool, CSF, blood, body, and seminal and vaginal fluids. Practical experience in bacteriology lab provides student with the opportunity to be familiarized with culturing bacteria, sensitivity test and media preparation.



PHE262 Principles of Heredity

This course discusses the principles of genetics and their applications to the study of biological functions. The student is first introduced to the applications of genetics in contemporary issues. Mendelian genetics is then thoroughly discussed at the levels of single-gene inheritance and multifactorial traits. Modifiers of Mendelian ratios, mitochondrial inheritance, sex-limited and sex-influenced traits, mutation theory, genetics of behavior, and pedigree analysis are also discussed.

PHE263 Molecular Genetics

Basics of molecular genetic processes in bacteria, plants, and animals. A study of gene organization and control of gene expression in prokaryotes and eukaryotes, emphasizing applications in modern biotechnology, and the genetic and biochemical techniques involved in manipulating and assaying gene expression. The genetic background of inherited disorders and diseases with genetic contribution, principles of gene therapy, normal chromosome structure and chromosomal analysis, chromosomal disorders, molecular diagnosis of genetic diseases.

PHE311 Medical Virology

Provides an overview on the classification, biophysical and biochemical characteristics of DNA and RNA containing bacterial, plant and animal viruses.

PHE368 Medical Biochemistry I

Plasmatic proteins. Serum lipoproteins and lipids. Exploration of glycerin, renal, hepatic. Blood gases. Nitrogen. Non protein constituents of blood. Mineral constituents of plasma. Urine analysis. Role of chemical messengers in the control of physiological and metabolic processes. It deals with biosynthesis, chemistry, and secretion of hormones as well as their mechanism of action.

PHE369 Medical Biochemistry I Lab

This practical course gives a hands-on experience on the scientific basis of phlebotomy (blood drawing), successful clinical steps in blood drawing, sample preparation, analytical (pre-post) errors, and spectrophotometry principles and procedures. The course includes weekly medical assessment of students for using spectrophotometry for various biochemical laboratory tests (glucose, cholesterol, hepatic enzymes, cardiac enzymes, minerals, electrolytes, and others). Training also encompasses the subjects of urine analysis (sample preparation, macroscopic and microscopic examination, interpretation of results) and spermograms (seminal analysis, sample preparation, macroscopic and microscopic examination, and interpretation of results).

PHE373 Medical Biochemistry II

Plasmatic proteins. Serum lipoproteins and lipids. Exploration of glycerin, renal, hepatic. Blood gases. Nitrogen. Non protein constituents of blood. Mineral constituents of plasma. Urine analysis. Role of chemical messengers in the control of physiological and metabolic processes. It deals with biosynthesis, chemistry, and secretion of hormones as well as their mechanism of action.



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STAT156 Principles of Biostatistics

This course aims at giving an introductory overview of statistics with applications in public health, biomedicine, and the biological sciences. Design of public health surveys and biomedical experiments and drawing appropriate conclusions from statistical analyses are emphasized. Topics of discussion include: exploratory data analysis, elements of probability, one sample test, nonparametric methods, contingency table analysis, and simple linear regression. All statistical concepts and procedures will be illustrated using public health and biomedical data.

Major Elective Courses

MLT364 Hereditary Disorders

Basics of inheritance patterns in genetic diseases, establishing pedigrees, biochemical and molecular basis of inheritance, relevance of cell division to genetic disorders, analysis of predisposition factors, and immunogenetics. Overview of prevalent hereditary disorders in Lebanon and its neighboring region, including: hemoglobin disorders, G6PD, FMF, cystic fibrosis, and others. Most recent progress in diagnosis and current approaches to treatment and prevention of these disorders. Student is to perform an individualized literature study selected in consultation with the course tutor.

MLT365 Medical Laboratory Technology Colloquium

This course reviews the broad principles learned throughout the Medical Laboratory Technology program to prepare the students to meet the requirements necessary to pass the Lebanese Medical Laboratory Colloquium.