School	Arts and Sciences		
Major	Bachelor of Biomedical Sciences		
Course Descriptions			
Code	**Title**	**Credits**	**Description**
BMED205	Biophysics	**3**	This course introduces the physical principles underlying biological structures, physiological processes, and biomedical technologies. Across seven topics, the course examines the physics of waves and light, the operating principles of common medical imaging modalities, the physical basis of radiation therapy and radiobiology, the fluid mechanics of blood circulation, the thermodynamics of the human body, and the physics of vision and hearing. Through lectures, problem-solving, and applied examples drawn from clinical and diagnostic contexts, students build the quantitative and conceptual foundation needed to understand how physical laws govern living systems and underpin modern biomedical instrumentation.
BMED360	Hematology	**3**	This course provides an integrated study of normal and non-malignant hematology with emphasis on laboratory investigation and interpretation. The course covers peripheral blood cells and complete blood count parameters, hematopoiesis, erythrocyte physiology and metabolism, iron homeostasis, anemias, inherited and acquired hemolytic disorders, erythrocytosis, and non-malignant leukocyte and platelet disorders. It introduces the principles and limitations of automated hematology analysis and emphasizes the correlation of hematologic indices, cell morphology, laboratory findings, and clinical information in the evaluation of hematologic abnormalities.
BMED360L	Hematology Lab	**1**	This course is a practical laboratory course based on the performance of laboratory procedures necessary to operate in a clinical hematology laboratory. Student laboratory sessions will allow the student to prepare and examine peripheral blood smears, observe normal and abnormal blood cells under microscope, perform blood cells count using improved Neubauer chamber, hematocrit, ESR, reticulocyte count, WBC and platelets estimation counts, PT and aPTT tests.
BMED370	Parasitology	**2**	This course provides comprehensive theoretical knowledge of medically important parasites, including their biology, transmission, pathogenic mechanisms, diagnosis, treatment, prevention, and public-health significance. It covers the biological characteristics and pathogenic mechanisms of different parasites and integrates clinical implications, clinical cases, and key laboratory approaches used for diagnosis. The course also addresses antiparasitic treatment, prevention and control measures, and the broader role of parasites in health and disease.
BMED370L	Parasitology Lab	**1**	This laboratory course trains students to detect and identify human parasites in clinical specimens using safe microscopy and concentration techniques. Students learn to differentiate protozoa, nematodes, trematodes, and cestodes by morphology and developmental stage, interpret parasitological findings and counts, and document their work in accurate scientific laboratory reports.
BMED425	Serology and Blood Banking	**3**	This course integrates immunohematology, transfusion medicine, and clinical serology. The course covers immunologic and genetic principles relevant to blood banking; ABO, H, Lewis, Rh/RhAG, and other clinically important blood group systems; hemagglutination and antiglobulin testing; compatibility testing, antibody identification, and investigation of ABO discrepancies; donor selection and infectious-disease screening; blood component preparation and selection; transfusion practice and adverse reactions; apheresis, massive transfusion, hematopoietic progenitor-cell transplantation, and hemolytic disease of the fetus and newborn. Clinical serology topics include acute-phase proteins, labeled immunoassays, nephelometry and turbidimetry, infectious-disease serology, autoimmunity, and tumor markers. Emphasis is placed on the principles, clinical relevance, and interpretation of laboratory methods and findings.
BMED425L	Serology and Blood Banking Lab	**1**	This course is a practical laboratory course based on the performance of laboratory procedures necessary to function in a serology laboratory and blood bank. Student laboratory sessions will allow the student to determine ABO and Rhesus blood group, perform crossmatch test, perform direct Coombs tests, perform latex agglutination tests (ASO, RF, CRP), febrile antigen tests (Widal, Wright), ELISA, and rapid immunochromatographic assays.
BMED430	Medical Microbiology	**3**	This course examines the principles of medical microbiology and the role of medically important bacteria in human infectious diseases. It addresses bacterial classification, structure, and physiological characteristics, as well as mechanisms of pathogenesis and host defense. The course also covers epidemiology, disease transmission, clinical manifestations, antimicrobial therapy and resistance, and strategies for treatment, prevention, and control. Emphasis is placed on relating bacterial characteristics and pathogenic mechanisms to disease and on interpreting and comparing relevant laboratory findings associated with selected bacterial infections.

BMED430L	Medical Microbiology Lab	**1**	This course provides students with fundamental knowledge and practical skills in medical microbiology, with emphasis on the laboratory diagnosis of infectious diseases. It covers the principles and procedures involved in the collection, transportation, processing, culture, isolation, and identification of clinically significant microorganisms from various clinical specimens. Students are introduced to microscopic, staining, cultural, biochemical, serological, and antimicrobial susceptibility testing methods used for the characterization of microorganisms. The course also emphasizes the interpretation and appropriate reporting of microbiological findings, as well as the application of laboratory safety, aseptic techniques, ethical principles, and professional practices in the medical microbiology laboratory.
BMED435	Carcinogenesis and Oncology	**3**	This advanced course provides in-depth knowledge of tumor biology. It covers the fundamental biological characteristics of tumors compared with normal and abnormal cells and tissues, as well as the molecular and cellular events involved in tumor development and progression. Topics include the molecular mechanisms by which tumor viruses transform host cells, including retroviral genome integration and proto-oncogene discovery; genetic and structural mechanisms of cellular oncogene activation; cytoplasmic signal-transduction pathways (eg. RTK–Ras, PI3K/Akt, and Jak-STAT) in dysregulated growth-factor signaling; the roles and inactivation mechanisms of tumor suppressor genes; and the impact of disrupted p53 signaling and apoptotic pathways on cancer development, progression, and therapeutic response. Through lectures and critical analysis of primary scientific literature, students evaluate current advanced topics in carcinogenesis—judging study design, data, and conclusions—and present their findings.
BMED445	Pathophysiology	**3**	Pathophysiology is an integrative biomedical science that provides a theoretical foundation for modern medicine.It examines the mechanisms underlying the origin and development of disease, the body's responses to injury, compensation for impaired functions, and recovery. The course bridges basic biomedical sciences and clinical medicine and provides a foundation for clinical reasoning among healthcare professionals. The course progresses from general concepts of disease and pathological processes to systemic disorders and common diseases affecting specific organs and systems. Topics include cellular adaptation and injury, inflammation, fever, immune dysfunction, and diseases of the cardiovascular, respiratory, gastrointestinal, hepatobiliary, pancreatic, and renal systems. Emphasis is placed on the relationships among etiology, pathogenesis, structural and functional alterations, clinical manifestations, laboratory findings, and disease outcomes. Clinical case discussions and laboratory-finding discussions are integrated throughout the course to develop students' ability to apply biomedical principles, analyze disease processes, and evaluate clinical and laboratory evidence.
BMED450	Clinical Chemistry	**3**	This course examines the biochemistry, physiology, and pathophysiological correlation of the major analytes assessed in the clinical chemistry laboratory, including carbohydrate, protein, lipid, and nonprotein nitrogen metabolism; vitamins and trace elements; diagnostic enzymology; hepatic, renal, and endocrine organ function; and acid-base/electrolyte homeostasis. Through case-based analysis of laboratory data, students develop the interpretive judgment, quality-assurance practices, and professional communication skills that define competent clinical decision-making in laboratory diagnostic services, in line with the course's defined learning outcomes and assessment structure.
BMED450L	Clinical Chemistry Lab	**1**	This lab gives students practical experience in common clinical chemistry tests. Students learn how to handle samples, perform laboratory tests, use basic laboratory techniques, and understand the results, with a focus on accuracy, safety, and good laboratory practice
BMED460	Histopathology	**3**	This course builds the histological and pathological foundations for interpreting tissue-level disease — from tissue preparation, staining, and microscopy to distinguishing normal microscopic architecture from pathological change. Students apply this foundation to hemodynamic disorders, neoplasia, and organ-system pathology across the respiratory, digestive, and reproductive systems, tracing structural change from embryogenesis through adulthood. Case-based and team-based exercises develop the diagnostic reasoning, professional communication, and ethical collaboration required for competent histopathological analysis, aligned with the course's defined learning outcomes and assessment structure.

BMED465	Modern Topics in Biomedical Sciences	**3**	This course provides students with an intellectually stimulating introduction to modern techniques in disease investigation, diagnosis, and management. It integrates key concepts from molecular, cellular, and systems biology, as well as neuroscience, to develop a comprehensive understanding of biomedical sciences. Students explore current research methods and emerging diseases, supported by relevant clinical examples and updated diagnostic guidelines. The course also introduces the principles of major endocrine disorders and their clinical investigation and management. Students are encouraged to build a broad scientific foundation that supports further study and specialization in areas of personal and professional interest.
BMED470	Clinical Mycology and Virology	**2**	This course provides a systematic, evidence-based introduction to medical virology and mycology, examining the structure, classification, replication, and pathogenic mechanisms of clinically significant viruses and fungi, each correlated with epidemiology, clinical presentation, treatment, and prevention. Students learn to justify and interpret standard laboratory diagnostic methods — culture, serology, antigen/antibody detection, and molecular assays — while practicing safe, standardized specimen handling. Case-based learning throughout develops diagnostic reasoning, current approaches to antiviral/antifungal resistance and vaccine-preventable disease, and the professional, ethical communication of microbiological findings, aligned with the course's defined learning outcomes and assessment structure.
BMED475	Clinical Hematology and Hemostasis	**2**	This course provides an integrated study of malignant and clonal hematologic disorders and disorders of hemostasis, with emphasis on laboratory investigation, classification, and interpretation. The course covers bone marrow and lymph node diagnostic evaluation; acute and chronic leukemias; myelodysplastic neoplasms; myeloproliferative neoplasms; plasma cell neoplasms; flow cytometry, immunophenotyping, and selected cytochemical methods; primary and secondary hemostasis; fibrinolysis; bleeding disorders; thrombophilia; anticoagulation; and the laboratory investigation of abnormal coagulation results. Emphasis is placed on integrating morphology, hematologic findings, immunophenotypic patterns, cytogenetic and molecular findings, and hemostasis test results with the clinical context. Disease nomenclature and classification are taught using the current WHO Classification of Haematolymphoid Tumours.
BMED485	Clinical Assessment and Techniques	**3**	This course equips students with the essential skills for proper specimen collection, handling, and processing in the medical laboratory. Students develop practical competency in basic blood, urine, stool, and body fluid testing. Emphasis is placed on understanding laboratory procedures and accurately interpreting test results. Infection prevention and control measures are integrated throughout all practical laboratory sessions and quality assurance and quality control principles are continuously applied to ensure accurate and reliable laboratory results.
BMED490	Medical Laboratory Management And Quality Assurance	**3**	BMED490 introduces the principles of quality control, quality management, and accreditation in medical laboratories.The course covers laboratory quality systems, internal and external quality assessment, audits, quality indicators, and accreditation requirements. Students develop foundational skills in interpreting quality control data, identifying errors, and applying quality improvement tools. The course also introduces the principles of medical laboratory management, safety, infection control, equipment, inventory, personnel, and organizational practices. It also covers medical ethics, professional responsibilities, and codes of conduct, with emphasis on ethical decision-making and quality improvement in laboratory practice.
MEDL399	Medical Laboratory Internship I	**3**	The first clinical laboratory internship aims to introduce students to the organizational structure, operational procedures, and professional responsibilities of personnel within a clinical laboratory. It enables students to develop practical competencies in laboratory safety, regulatory compliance, quality control, specimen collection and handling, reagent preparation, and the appropriate use of medical terminology. Students gain supervised hands-on experience in the collection, processing, and preliminary analysis of clinical specimens in hematology, clinical chemistry, parasitology, urinalysis, and body fluid analysis. The internship emphasizes the application of standard operating procedures, accuracy, biosafety, and quality assurance in routine laboratory practice. By the end of the internship, students are expected to demonstrate foundational technical skills, professional conduct, and an understanding of the quality and safety standards required in clinical laboratory services.

MEDL499	Medical Laboratory Internship II	**3**	The second clinical laboratory internship aims to enhance students' practical competencies in advanced laboratory techniques and diagnostic procedures used in clinical laboratory settings. Students develop the ability to apply appropriate methodologies for specimen processing, laboratory analysis, and interpretation of results across specialized diagnostic disciplines. The training focuses on hemostasis, serology, blood banking and transfusion medicine, bacteriology, genetics, and other specialized laboratory procedures. Students strengthen their ability to implement standard operating procedures, comply with quality assurance requirements, and adhere to laboratory safety and professional standards. By the end of the internship, students are expected to integrate theoretical knowledge with practical skills to support accurate, reliable, and quality-assured clinical laboratory investigations.