Department of Medical Laboratory Technology

Medical Laboratory Science Program

Program Information

Organization	Public Authority for Applied Education and Training / College of Health Sciences
Program Number	309
Instructional Level	Two-Year Technical Diploma
Instructional Area	Health Services
Revised By	Dr. Abdullmonem Ramadhan &Amani Alshatti

Target Population
High school graduate (Science major), priority for Kuwaiti and GCC male and females or transferred students from other scientific majors according to regulations

Description
The Medical laboratory technology department provides the MLT students with a comprehensive two years course diploma. The objective of our courses is to introduce our MLT students to all the principles of the basic test performed on the various blood and biological material so they can safely and efficiently work in the various domains of the laboratory services as well trained and highly skilled assistant medical laboratory technologist. The course of this diploma are designed to familiarize the students with the major ongoing laboratory activities in particular those related to the fields of applied Clinical Chemistry, Parasitology, Microbiology, Histopathology and Clinical and Immuno Hematology. Didactic lectures, instructions and practical training will be provided according to the standardized regulations and safety of both the Ministry of Health and the administration of laboratory services in Kuwait. Moreover, intensive summer hospital training will be offered in the form of a 25 hr/wk for a period of 7 weeks prior to graduation.

Indirect Measures

1. Job Placement

External Requirements

1. Ministry of health in Kuwait (medical laboratory standards)
2. Center for Disease Control (CDC) standards

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Career/Job Titles

1. Medical Laboratory Assistant Technician

Related DACUM Studies

DACUM A

DACUM Title	Clinical Laboratory Science
Date	5/12/2005
Organization	paaet
Facilitator	Noora Alajme, Dhuha Alkhuraief
Methods	Other
Notes	All DACUM analysis was conducted for Medical Laboratory Technologist from job market.

Entry Requirements

1. Priority for Kuwaitis
2. Has a high school degree with major science
3. Has to pass the admission tests and medical check
4. Has to fulfill all PAAET requirements
5. Non-Kuwaiti acceptance has to be under PAAET conditions

Program Outcomes

A. Demonstrates the principles of testing procedures and methodologies including theory and application.
B. Apply blood sampling procedures according to the Ministry of Health rules and instructions.
C. Handle all duties (night, afternoon and weekend) according to the Ministry of Health rules and instructions.
D. Evaluate testing procedures with proficiency and specificity in each laboratory department.
E. Analyze test results from laboratory data including statistical analysis for quality assurance.

External Standards

Ministry of Health in Kuwait (Medical laboratory Standards)

Center for Disease Control (CDC) standards

Course Configuration

Semester	Course #	Course Title	Credits	Contact Hrs	Category
Year 1	100	Laboratory Equipment	1	2	Major Requirement
Year 1/semester 1	101	Introduction to Medical Laboratories	1	1	Major Requirement
Year 1/semester 1	114	Chemistry for Health Sciences	4	5	Science Requirement
Year 1/semester 1	120	Biology	1	1	Science Requirement
Year 1/semester 1	155	General Microbiology	3	4	Science Requirement
Year 1/semester 1		General elective	2	2	Elective
Year 1/semester 1	101	English	2	3	Language Requirement
Year 1/semester 2	110	Biostatistics	1	1	Science Requirement
Year 1/semester 2	158	Anatomy and Physiology	2	2	Science Requirement
Year 1/semester 2	150	Medical Terminology	1	1	Science Requirement
Year 1/semester 2	177	Biochemistry	3	4	Science Requirement
Year 1/semester 2	109	English for Medical Lab	2	3	Gen Ed Requirement
Year 1/semester 2	108	Introduction to Computer	3	2	Gen Ed Requirement
Year 1/semester 2	101	Islamic Culture	2	2	Gen Ed Requirement
Year 2/semester 1	210	Parasitology I	3	4	Major Requirement
Year 2/semester 1	201	Medical Microbiology I	3	4	Major Requirement
Year 2/semester 1	220	Histopathology I	3	4	Major Requirement
Year 2/semester 1	230	Hematology I	3	4	Major Requirement

Year 2/semester 1	240	Clinical Chemistry I	4	7	Major Requirement
Year 2/semester 2	212	Parasitology II	3	1	Major Requirement
Year 2/semester 1	155	Quality control and quality assurance	2	3	Major Requirement
Year 2/semester 2	202	Medical Microbiology II	3	1	Major Requirement
Year 2/semester 2	222	Histopathology II	3	1	Major Requirement
Year 2/semester 2	232	Hematology II	3	1	Major Requirement
Year 2/semester 2	242	Clinical Chemistry II	4	1	Major Requirement
Year 2/semester 2	114	Introduction to Psychology	2	2	Elective
Year 2/semester 2	123	Human Relative	2	2	Elective
Year 2/semester 2	125	Kuwait and Development	2	2	Elective
Year 2/semester 2	111	Environment Science	3	4	Elective
Year 2/semester 1	103	Introduction to medical Record	2	2	Elective
Year 1/semester 2	101	First Aid	2	2	Elective
Year 1/ semester 2	101	Nutrition Science	2	2	Elective
Year 2/ summer course	250	Summer Clinical Science	4	175	Major Requirement
Total required for Graduation			**68**	**255**	

Program Course Details

Course A -- Laboratory Equipment

Course Number 100

Credits 1

Contact Hours 2

Total Hours 0

Category Major Requirement

Course Description

This course is designed to prepare the students to properly handling of laboratory chemicals; operate common analytical instruments; describe the theory and applications of various analytical instruments including types of electrophoresis, spectrophotometry, chromatography, autoclave, and centrifugation; and practice laboratory safety**.**

Course B -- Introduction to Medical Laboratories

Course Number	101
Credits	1
Contact Hours	1
Total Hours	0
Category	Major Requirement

Course Description

An overview and introduction to laboratory safety and basic skills as used in specimen processing and laboratory information systems. Universal precautions and proper procedures in regard to specimen processing will be taught to the student. Laboratory mathematics, quality control, and the proper use of instrumentation will be presented as used in the clinical laboratory, physician's office laboratory, and laboratory science areas.

Course C -- Chemistry for Health Sciences

Course Number	114
Credits	4
Contact Hours	5
Total Hours	5
Category	Science Requirement

Course Description

This course will expose the student to introductory chemistry with an emphasis on topics that are particularly related to health sciences. The course will motivate students to learn

chemistry by showing them how to think through a problem and formulate solution strategies. The accompanying labs will reinforce lecture through hands-on experimentation. Students will acquire skills in visualizing the molecular world of health science.

Course D -- Biology

Course Number 120

Credits 1

Contact Hours 1

Total Hours 1

Category Science Requirement

Course Description

The course will explore fundamental principles and concepts of Biology. Emphasis is placed on basic biological chemistry, cell structure and function, metabolism and energy transformation, genetics, classification and other related topics.

Course E -- General Microbiology

Course Number 155

Credits 3

Contact Hours 4

Total Hours 4

Category Science Requirement

Course Description

This course is an introduction to microbial world. It covers the place of organisms in the living world; origin of microbes; applied areas of microbiology; microscopy; morphology and fine structure; cultivation; reproduction and growth; cultural characteristics; introduction to yeast, algae, molds, protozoa and viruses.

Course F -- General Elective

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course G -- English

Course Number 101

Credits 2

Contact Hours 3

Total Hours 3

Category Language Requirement

Course Description

This course focuses on the language skills of listening, speaking, reading and writing. Basic vocabulary and grammar are covered, with emphasis on functional, effective communication. Students read and write short reports and texts, listen to authentic dialogues produced by native English speakers, and practice giving directions and instructions.

Course H -- Quality control and quality assurance

Course Number 155

Credits 2

Contact Hours 3

Total Hours 3

Category Major Requirement

Course Description

Quality control is a course in Q.C terminology, practice, troubleshooting for the clinical laboratory. Design for those who have little or no experience with quality control but need a firm grounding. The course aims to impact a working knowledge with the best practice in quality assurance and control.

Course I -- Biostatistics

Course Number 110

Credits 1

Contact Hours 1

Total Hours 1

Category Science Requirement

Course Description

This course will familiarize students with the rudiments of statistical theories and effective thinking to solve problems and simple equations. Furthermore, applied practices are implemented as part of statistical methods used in academic research. Primary topics include graphing and summarizing data, probability, estimation, hypothesis testing and simple regression analysis.

Course J -- Anatomy and Physiology

Course Number 158

Credits 2

Contact Hours 2

Total Hours 2

Category Science Requirement

Course Description

This course provides an introduction to human morphology at the cell, tissue and organ system levels of organization. The course is taught through theoretical lectures and practical demonstration.

Course K -- Medical Terminology

Course Number 150

Credits 1

Contact Hours 1

Total Hours 1

Category Science Requirement

Course Description

The Medical Terminology course provides an introduction to the principles and language of medical terminology. Students will develop an understanding of basic medical terms including concepts of anatomy, physiology and pathology**.**

Course L -- Biochemistry

Course Number	177
Credits	3
Contact Hours	4
Total Hours	4
Category	Science Requirement

Course Description

This course explores the roles of essential biological molecules focusing on protein chemistry, while covering lipids and carbohydrates. It provides a systematic and methodical application of general and organic chemistry principles.

Course M -- English for Medical Laboratory

Course Number	109
Credits	2
Contact Hours	3
Total Hours	3
Category	Gen Ed Requirement

Course Description

English for MLT students course is designed to serves many purposes which include: enhancing medical entrants, reading comprehension skills, providing basic vocabulary; developing basic academic and scientific writing skills; introducing students to the English medical terminology of medical laboratory science.

Course N -- Introduction to Computer

Course Number	108
Credits	3
Contact Hours	2
Total Hours	4
Category	Gen Ed Requirement

Course Description
This course presents the structure of personal computers and fields of application, communication systems, software's and data processing systems.

Course O -- Islamic Culture

Course Number	101
Credits	2
Contact Hours	2
Total Hours	2
Category	Gen Ed Requirement

Course Description
This course discusses the concepts of Islamic culture: sources and characteristics; cosmos and man; the importance of Islamic legislation; social solidarity; work and labor's rights and duties; the importance of health in Islam; and Islam's attitude towards contemporary issues and world ideologies.

Course P -- Parasitology I

Course Number	210
Credits	3
Contact Hours	4
Total Hours	4
Category	Major Requirement

Course Description
This course deals with different types of helminth parasites which are seen in Kuwait and neighboring countries and immigrants who come to Kuwait seeking jobs.

Course Q -- Medical Microbiology I

Course Number	201
Credits	3
Contact Hours	4
Total Hours	4
Category	Major Requirement

Course Description
This course is designed to introduce students to fundamental concepts of medical microbiology and the application of those concepts to human disease.

Course R -- Histopathology I

Course Number	220
Credits	3
Contact Hours	4
Total Hours	4
Category	Major Requirement

Course Description
This course introduces the student to study and know principles of histopathology techniques in various histopathology labs, starting from receiving the specimen, registering, fixation and processing the specimens in a way to produce a paraffin block ready for cutting and staining with haemotoxylin and eosin stain and then choosing an appropriate stain for each case.

Course S -- Hematology I

Course Number	230
Credits	3
Contact Hours	4
Total Hours	4
Category	Major Requirement

Course Description
This course deals with aspects of hemopoiesis, physiology, composition and function of blood. The students will learn about various types of blood cells, their structure, function, enumeration and differentiation. It also deals with the general and specific aspects of the various types of anemia. The applied part of the course mainly deals with blood sampling skin-puncture and venipuncture, specimen handling and processing, data registration and storage and disposal of blood samples. Moreover, there will be special emphasis on the basic hematological techniques of blood routine

examinations and the various manual and automated hematological procedures involved in laboratory hematological blood testing and in those required for investigation of various types of anemia. Also, students will appreciate how to interpret the various results pitfalls and errors and the advantages and disadvantages of each procedure. Instructions include proper procedural methodologies, quality control use of standards and interpretation of test results will also be included.

Course T -- Clinical Chemistry I

Course Number	240
Credits	4
Contact Hours	7
Total Hours	7
Category	Major Requirement

Course Description

This course is a basis of chemical pathology for medical laboratory technology students. While reviewing and covering introductions to all those topics: diabetes mellitus, jaundice, non-protein nitrogen metabolite, renal function test (including urinalysis), plasma proteins, lipoprotein, electrophoresis, iron metabolism, thyroid function test, and CSF, laboratory mathematics and the appropriate analytical aspects used of biochemical tests with their interpretation.

Course U -- Parasitology II

Course Number	212
Credits	3
Contact Hours	1
Total Hours	7
Category	Major Requirement

Course Description

This course deals with the different types of protozoa parasites which are seen in Kuwait and neighboring countries and in immigrants who come to Kuwait seeking jobs.

Course V -- Medical Microbiology II

Course Number	202
Credits	3
Contact Hours	1
Total Hours	7
Category	Major Requirement

Course Description

An introduction to the theory and application of basic immunology, including the immune response, principles of antigen-antibody reactions and the principles of serological procedures**.**

Course W -- Histopathology II

Course Number	222
Credits	3
Contact Hours	1
Total Hours	7
Category	Major Requirement

Course Description

This course introduces the student to study and know the normal cells and tissues of all the organ systems of the human body, starting from the circulatory system, skin , skeletal tissues…etc. in addition to the examination of the tissue and cells under the microscope for all the organs of the human body.

Course X -- Hematology II

Course Number	232
Credits	3
Contact Hours	1
Total Hours	**7**
Category	Major Requirement

Course Description

This course covers the areas of hematology that include both leukemia and hematological malignancies, issues of hemostasis and coagulation, immuno-

hematology and quality assurance. It is divided into four sections. The first section is designated to describe the process of white blood cell formation and some of their benign disorders. Moreover, it encompasses concise and updated information about the pathogenesis, clinical features, international guidelines for the classification and diagnosis of acute and chronic lympho- and myeloproliferative disorders. It also includes a brief summary on the most recent laboratory investigations required for their accurate diagnosis and follow up. The second section is dedicated to the study of the physiology of hemostasis. The related hemorrhagic disorders and the necessary tests required for their diagnosis. The third section deals with the blood banking issues. It includes the basic information important for understanding the basic antigen antibody reaction techniques, red cell antigens and antibody systems, pretetransfusinon testing protocols and the possible related blood transfusion reactions. The fourth section provides basic knowledge on the quality assurance policies and how to apply internal and external quality control programs and how to detect report and solve the various types of laboratory errors and mistakes.

Course Y -- Clinical Chemistry II

Course Number	242
Credits	4
Contact Hours	1
Total Hours	7
Category	Major Requirement

Course Description

This course is a continuation on clinical chemistry 1. While reviewing and covering all those previous topics it focuses on: clinical enzymology, water and electrolyte, acid base balance, calcium, phosphate and magnesium metabolism, trace elements, laboratory mathematics and principles and applications of immunochemical technique for specific protein analysis for RIA and ELISA and quality control. In addition students are assigned to different clinical laboratory practice to become familiar with laboratory operations and organization to gain experience for performing laboratory procedures.

Course Z -- Introduction to Psychology

Course Number 114

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

The course focuses on the principles and concepts of psychology and on behavioral physiological principles.

Course AA -- Human Relations

Course Number 123

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

This course is an introduction to the behavioral sciences as they apply to management. It includes a study of individual behavior as it relates to leadership traits, individual behavior in organizations, and related subjects of motivation and leadership. Students are presented with opportunities to become more effective, discerning, ethical, flexible, perceptive, and understanding in both professional and personal endeavors.

Course BB -- Kuwait and Development

Course Number 125

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

Its overall goal of this course is to improve the understanding of the current Kuwait cultural environment, its components, and its relation to national and regional affairs. Instruction is in Arabic.

Course CC – Environmental Sciences

Course Number 111

Credits 2

Contact Hours 2

Total Hours 4

Category Elective

Course Description

This course intended to provide a background of the basic chemical, physical and biological concepts and processes that help to understand environment and how it works; analyze relationship between humans and the environment including causes of environmental problems and consequences of human impact on the environment; identify major environmental problems and pros and cons of possible solutions.

Course DD -- Introduction to Medical Record

Course Number 103

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

This course begins with an orientation to the structure and content of health information. This course will emphasize on the storage, uses, and reporting of health information and it will focuses on reimbursement and legal issues, supervision and professional development.

Course EE -- First Aid

Course Number 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

The course is basic information and skill practice to implement emergency interventions in the home, work place and community. Safety measures to protect children and adults from accidents are discussed.

Course FF -- Nutrition Science

Course Number 101

Credits 2

Contact Hours 2

Total Hours 2

Category Elective

Course Description

This course is designed to teach the scientific principles of human biology using nutritional concepts to promote personal health and well being. The course will covers the nutrient categories and how they function in the body, includes nutritional implications of major diseases, food safety.

Course GG -- intensive Clinical laboratory training in hospital

Course Number 250

Credits 4

Contact Hours 0

Total Hours 175

Category Major Requirement

Course Description

This course of studies is designed to prepare the graduate to work as a member of a clinical laboratory staff. As part of a clinical lab team, students will be trained to perform scientific laboratory testing and it will provide the knowledge, skills and professional attitude necessary to accurately and proficiently perform and evaluate clinical laboratory analyses.

The whole period of this course will be spend in the clinical laboratory in hospital belong to Kuwait ministry of health.