

**Level One**

Code	No	Title	Unit
Eng	11.03	English Language	3(3+0)
Chm	11.01	General Chemistry	3(3+0)
Zoo	11.01	General Biology	3(3+0)
Com	11.03	Introduction to Computer	3(3+0)
Ter	11.02	Medical Terminology	2(2+0)
Islam	11.01	Islamic Culture	1(1+0)
Total			15

**Level Two**

Code	No	Title	Unit
Chm	12.02	Basic Analytical Chemistry	3(3+2)
Bio	12.02	Basic biochemistry	3(3+2)
Mic	12.02	Basic Microbiology	3(3+2)
Hem	12.02	Hematology Diseases	3(3+2)
Par	12.02	Medical Parasitology	3(3+2)
Total			15

**Level Three**

Code	No	Title	Unit
<b>Bio</b>	12.03	Clinical Biochemistry	3(3+3)
<b>Mic</b>	12.03	Medical Bacteriology 1	3(3+3)
<b>Imm</b>	12.02	Basic Immunology	3(3+3)
<b>AE</b>	12.02	Emergency Services	2(1+3)
<b>Vir</b>	12.02	Medical Virology	2(3+0)
Total			13

**Level Four**

Code	No	Title	Unit
Bio	12.04	Clinical Biochemistry 2	3(3+2)
Mic	12.04	Medical Bacteriology 2	3(3+2)
Hem	12.03	Blood Bank & Blood Transfusion	3(3+2)
Myc	12.02	Medical Mycology	2(3+0)
Saf	12.02	Safety & Laboratory Management	2(3+0)
Hem	12.04	Blood - Clotting	2(1+3)
Total			15

**Level Five**

Code	No	Title	Unit
Bio	13.03	Biochemistry Clin Practice	2(0+4)
Mic	13.03	Microbiology Clin Practice	2(0+4)
Hem	13.03	Hematology Clin Practice	2(0+4)
Epi	13.03	Introduction to Epidemiology	2(0+4)
FSt	13.03	Independent Study	2(0+4)
Gen	13.03	Medical Genetics	2(0+4)
Total			12

Eng. ١١٠٣

English Language

٣ (Theoretical)

Aims & Objectives:

This course is designed to promote the standards of English and develop reading, writing, listening, and speaking skills. Class discussion should be encouraged, and oral conversations should be practiced daily. The topics discussed should carefully be selected to suit the field of the students' specialization.

At the end of the course, the student should be able to:

١. Understand differences between nouns, verbs, and other words in the sentence.
٢. Understand simple written and spoken English.
٣. Speak simple English with no grammatical mistakes.
٤. Write correctly with no spelling mistakes.

Zoo. ١١٠١

General Biology

٣ (٢ Theoretical + ١ Practical)

Aims & Objectives:

This course is intended to provide the beginning student with a background in the fundamentals of the Biological Sciences which helps in preparing them for careers in medical technology.

The course introduces basic biological principles, stressing the chemistry of life processes with particular references to man. It includes cell structure and function; digestive system; respiratory system, blood circulatory system; maintenance of body fluids (fluid and electrolyte balance). The course will also cover, cell structure and function, body control systems (nervous and endocrine), locomotion system (musculoskeletal), human reproduction.

The practical part is intended to provide the beginning student with selected laboratory experiences concerning the fundamentals of Biological Science. The focus of the lab exercises will be organic molecules, and cell structure and function. Upon successful completion of this course, the student should demonstrate approved techniques of handling laboratory specimens and equipment. He should be able to record data accurately and in proper form and describe the characteristics and properties of cellular structures and biomolecules and different systems studied in the laboratory.

Chm. ١١٠١

General Chemistry

٣ (٢ Theoretical + ١ Practical)

Aim & Objectives:

This course is designed to provide the student with an adequate background in the fundamental concepts of chemistry such as classify matter, perform calculations related to density, specific gravity, and perform calculations related to the mole concept.

Organic chemistry part will cover the structure, nomenclature, reactions, and synthesis of the main types of organic compounds especially aromatic and carbonyl compounds and the understanding of the basics of lipids, carbohydrates, amino acids, proteins, and nucleic acids.

In practical part of this course, the student will gain the ability to demonstrate approved techniques in handling laboratory equipment; record data accurately and in proper formats; make and use measurements to calculate descriptive properties of matter such as density, mass, volume, concentration, chemical formulas.

For the practical organic chemistry part, the student should demonstrate the ability to follow laboratory procedures for separation, purification, and identification of organic compounds. He should also be able to give complete structures from the names; determine the structure of compounds from experimental data; understand how functional group structure determines chemical reactivity as well as the mechanism of a reaction based upon the structure of the functional group.

Islam ١١٠١

Islamic Culture

١ (Theoretical)

#### Aims & Objectives:

This course is designed to provide the student with the Islamic views on human, the family, his rights and duties towards the other members of the community and the governing system.

Com. ١١٠٣

Introduction to Computer

٣ (٢ Theoretical + ١ Practical)

#### Aims & Objectives:

The course introduces students to personal computers and applications. It also describes the use of computers and data processors in the Radiology Department.

At the end of the course, the student should be able to:

١. Define the components of the computer and their functions.
٢. Use computer software. e.g. database and spread-sheets.
٣. Understand various operation systems.
٤. Understand the use of computer in Radiology Department.
٥. Use the Internet.

Chm. ١٢٠٢

Basic Analytical chemistry

٣ (٢ Theoretical + ١ Practical)

#### Aims & Objectives:

The Course involves the application of various laboratory methods for determining composition of samples, both qualitatively and quantitatively. These

topics provide the student with the knowledge and skills required to understand the aspects of analytical chemistry which are essential for the medical laboratory technician. On successful completion of the course, the student will have a sound knowledge of the terms, definitions, principles and techniques of analytical chemistry.

Bio. 1202	Basic Biochemistry	3 (2 Theoretical + 1 Practical)
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Aims & Objectives:

This course considers how the analysis of samples from the body for various constituents can give insight into pathological processes. Included are the principles for tests routinely carried out in a clinical biochemistry laboratory, and the biological understanding of test results. Specific subjects considered are clinical enzymology, heme catabolism, liver function toxicology and therapeutic drug monitoring principles of immunoassays, blood carbohydrates, lipids, proteins, porphyrins, endocrinology, gastric and GI function, fetal-placental function, and biochemical tumor markers.

While in laboratory hours, students will study the structure, metabolism and function of carbohydrates, lipids, proteins and enzymes present in the human body. Pathological conditions which cause an increase or decrease in the above compounds are discussed. Laboratory methods used to determine the concentration of carbohydrates, cholesterol, protein and selected enzymes in body fluids are analyzed

Mic. 1202	Basic Microbiology	3 (2 Theoretical + 1 Practical)
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Aims & Objectives:

This Course is designed to build on work carried out in General Biology code No. 1101 and to introduce the student to important topics which are preparatory to other Courses in the Medical Laboratory Technology Clinical Curriculum. The Course involves a study of major topics in microbiology, and immunology, but covering the basic elements only in each case. The Course incorporates a practical Study Unit, which introduces students to some of the fundamental principles and techniques, met in the lectures. It is an essential feature of this Course, that it provides the basis, not only, for further studies in Mic. 1203 and Imm. 1202, but also, complements other clinical and professional Courses in the MLT Clinical Curriculum.

Upon completing the Course successfully, the student will have a sound knowledge of the terms, definitions, techniques and processes commonly used in microbiology and Immunology. It is important to emphasize that the student will only be familiar with the fundamentals of each topic only. Nevertheless, this will be more than sufficient to allow the student to approach his studies in at more advanced level with confidence. In addition, he will have continued to develop and improve upon his practical skills and expertise.

Hem. 1202	Hematology Diseases	3 (2 Theoretical + 1 Practical)
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Aims & Objectives:

This course is a study of the production and function of the normal blood cells (erythrocytes, leukocytes and platelets) and of some of the procedures performed routinely in the clinical laboratory for erythrocyte, leukocyte and platelet counts, hemoglobin and hematocrit determinations and the evaluation of blood films for normal and abnormal smears. The course also includes very basic introduction to the

theory and routine tests for hemostasis, haemostatic disorders and laboratory techniques used in the diagnosis of bleeding disorders will be studied.

For the practical sessions, abnormal blood findings plus other diagnostic procedures will be studied in the laboratory. Students will also learn how to utilize special stains and bone marrow studies. The erythrocytes, thrombocytes and all types of leukocytes are studied and analyzed in laboratory tests, as well as their origin and development. Students will also learn how to perform ABO forward and reverse grouping, Rh grouping and the antiglobulin test (direct and indirect).

Par. ١٢٠٢

Medical Parasitology

٣ (٢ Theoretical + ١ Practical)

#### Aims & Objectives:

This Course is designed to introduce the student to the study of parasitology. It will consider parasites of medical importance and in particular, will focus attention on those parasitic diseases indigenous to Saudi Arabia and the Gulf region. The Course will cover the classification, general morphology, life-cycle patterns, disease transmission, symptoms and the specific sites of parasitic infection in the human body. In the practical component, the student will be introduced to a limited range of laboratory methods and diagnostic techniques, employed in the examination of specimens, (stool, blood and urine), for parasitic infections in selected cases.

On completing this Course successfully, the student will be able to demonstrate a sound knowledge of parasitic infections commonly found in the Gulf region and will have a basic general knowledge of other medically-important parasites, their life-cycles, means of transmission and clinical signs of infection. In addition, the student will be able to conduct the macroscopic laboratory examination of parasitically-infected specimens in a competent, safe and hygienic manner.

Bio. ١٢٠٣

Clinical Biochemistry (١)

٣ (٢ Theoretical + ١ Practical)

#### Aims & Objectives:

A study of the clinical chemistry of blood, urine, and other body fluids is applied to carbohydrates, lipids, proteins, amino acids, nucleic acids and enzymes. The use and interpretation of clinical procedures are discussed with emphasis on the critical appraisal of laboratory methods as applied to the study of disease.

Clinical chemistry is primarily concerned with the chemical balance of the body. Blood and other body fluids are analysed for a large number of compounds, using a variety of analytical techniques. The information gained is used, in conjunction with laboratory data from other disciplines, to assist in the diagnosis and treatment of disease by other health care professionals.

In the laboratory, the concepts of qualitative and quantitative analytical chemistry using basic and advanced laboratory instrumentation are studied. Laboratory safety methods are learned and practiced throughout. Statistical methods,

Mic. ١٢٠٣	Medical Bacteriology (١)	٣ (٢ Theoretical + ٣ Practical)
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quality control and quality assurance methods are applied in all phases of laboratory work. This course will provide the knowledge and skills required to perform selected tests for carbohydrates, electrolytes, enzymes, renal and liver functions. Students will also perform analysis for proteins, therapeutic drugs, drugs of abuse, and endocrine testing.

#### Aims & Objectives:

This course introduces students to the basic bacteriology, classification, structure, function, ecology, nutrition, physiology and genetics of bacteria. Methods used in microbial isolation, growth, metabolism, identification, enumeration and control. Also, principles of resistance and immunity are also introduced to the student.

Laboratory exercises provide practical experience and complement the theory that aims toward acquainting students with the fundamental principles and basic laboratory procedures used in working with microorganisms, especially those of medical importance. This includes inoculation and incubation of media, differentiation between normal and pathogenic bacteria, biochemical and other appropriate tests to identify Pathogens, antibiotic sensitivity testing, and Quality Control will also be exercised.

Imm ١٢٠٢	Basic Immunology	٣ (٢ Theoretical + ٣ practical)
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#### Aims & Objectives:

This course teaches principles of basic physiology of the immune system both innate and acquired. It will cover the involvement of the immune system in various disease states and clinical conditions. Students will be introduced to the principles of antigen-antibody reactions and their application in many laboratory tests.

For the practical sessions, types of antigen-antibody reactions are studied and agglutination testing -is performed in the laboratory. Serial dilutions are made and interpreted.. Basic immunologic procedures including precipitation reactions and labeled immunoassays will also be experienced. Lab procedures will also include the use and interpretation of commercial serology test kits.

AE ١٢٠٢	Emergency Services	٢ (١ Theoretical + ٣ practical)
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#### Aims & Objectives:

This course includes techniques for taking and reading vital signs as well as CPR For Health Care Providers. Prevention, recognition and treatment of medical emergencies in dentistry as well as patient health history, vitals. air-ways, resuscitation equipment, emergency kits, and an overview of pharmacology.

*Students will:*

- Gain an excellent knowledge of the types of medical emergencies in Medical Laboratory as well as a variety of conditions and diseases.
- Receive the required skills in First Aid and CPR.

Vir 1202

Medical Virology

2 (Theoretical)

Aims & Objectives:

An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined too.

Bio. 1204

Clinical Biochemistry (2)

3 (2 Theoretical + 1 Practical)

Aims & Objectives:

This course is a continuation of the first clinical chemistry in topics. Designed to provide further instruction and study of the techniques of clinical chemistry testing and laboratory practice used to evaluate different human body organs and systems. Further practical sessions will provide the MLT student with the opportunity to perform various chemistry methods of analysis used in clinical laboratories to assist in diagnosing, monitoring treatment, and preventing disease.

Mic. 1204

Medical Bacteriology (2)

3 (2 Theoretical + 1 Practical)

Aims & Objectives:

The course objective is to provide the students with a working knowledge of the tests and systems necessary to identify medically important bacteria. The material covered includes the systematic study of bacteria of medical importance together with an understanding of their relationship to disease processes.

Antibiotic sensitivity testing and serological methods of measuring antibodies will also be covered.

In the practical part, students will learn how to perform isolation and identification techniques for clinically significant microorganisms from the eye/ear, genital tract, cardiovascular and central nervous systems, and skin/wound/soft tissue sites. Antimicrobial susceptibility testing will be studied and practiced and molecular diagnostics techniques will be introduced.

Hem. 1203 Blood bank & Blood Transfusion 3 (2 Theoretical + 1 practical)

Aims & Objectives:

This course involves the study of red cell blood group systems as they apply to the testing of blood for transfusion purposes. The detection, treatment and prevention of Hemolytic Disease of the Newborn is also covered.

Included in this course also, will be a study of transfusion practices and problems, blood components and donor requirements. Also included will be the methods, practical experiences and equipment needed to gain a full understanding of a transfusion laboratory.

Myc. 1202

Medical Mycology

2 (Theoretical)

Aims & Objectives:

This course will acquaint the student with the subject of medical mycology. Classification and characteristics of pathogenic fungi are presented. The laboratory exercises will concentrate on preparation & specimens, laboratory procedures, and identification of organisms encountered in mycology studies.

*Upon successful completion of this course, the student should be able to:*

Determine the presence of and identify the fungal forms.  
 Differentiate between molds and yeasts.  
 Define the basic terms used to describe the fungi both microscopically and macroscopically.  
 Discuss the various classifications of the fungi.  
 Discuss the procedures used in properly collecting specimens for mycology.  
 Discuss the reasons for direct examination of every mycology specimens.  
 Discuss the use of various stains used in mycology examinations.  
 Discuss the various techniques and media used for cultivating fungi, discuss the effects of time and temperature on fungal growth, define rapid, intermediate and slow growth rates.  
 Describe the methods of inoculation of various media for fungal isolation.  
 Compare teased mount and slide culture techniques, describe morphological features used to identify fungi in different preparations.  
 Discuss the use of skin tests and serology in identifying my cases.  
 Discuss the diseases caused by the yeasts, candidiasis, cryptococcosis, geotrichosis and opportunistic pathogens and dimorphic organisms.  
 Discuss the yeast including which tests are used to differentiate then, germ tube, carbohydrates assimilation and fermentation, capsule, and pigment production.

Saf. ١٢٠٢	Safety & Laboratory Management	٢ (٢ Theoretical)
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#### Aims & Objectives:

This course introduces some of the statistical skills necessary for scientific research. Topics include: measures of central tendency and dispersion; probability; probability distributions; quality control; interval estimation; Z, t, F and chi-square hypothesis tests.

An introduction to the principles of management as they apply to clinical laboratories. Subject matter will include the management process in small and large clinical laboratories, performance appraisals and setting priorities for laboratory services.

The course will also cover the skills required for management roles, with a complete overview of methods used to ensure quality patient management, quality assurance and quality control techniques.

Hem. ١٢٠٤	Blood Clotting	٢ (١ Theoretical + ١ Practical)
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#### Aims & Objectives:

A study of homeostasis and coagulation in normal and disease processes will be explored. Identification of significant cellular changes is stressed Blood coagulation function testing and coagulation lab, will be studied, will be studied, performed and evaluated.

Upon completion of the lecture-portion this course the student shall be able to:

Discuss basic theories of hemostasis including:

Interrelationship of the three systems in the hemostatic mechanism.

Cascade theory.

Fibrinolytic mechanism.

Regulatory mechanism.

Discuss routine and special laboratory examination of the hemostatic mechanism.

Discuss qualitative and quantitative platelet disorders.

Discuss antithrombic therapy as it relates to laboratory procedures.



Discuss homeostasis , distinguishing between hereditary and acquired disorders.  
Evaluate given clinical and laboratory data and determine cause of defects in the haemostatic mechanism.

Discuss the principles of insemination in coagulation laboratory.

Upon completion of the laboratory practical- portion of this course, the student shall be able to:

- Demonstrate proper use of the various anticoagulants required in the clinical laboratory.
- Perform the procedures used for the blood samples, properly label samples and determine specimen acceptability for coagulation procedure.
- Demonstrate working knowledge of and operate the equipment required in coagulation laboratory including pipettes, centrifuges, semi-automated and automated optical clot detection equipment.
- Perform all procedures with regard to prescribed safety protocol.
- Demonstrate ethical and professional responsibility in the performance of all procedures.

#### Medical Genetics

3 (Theoretical) Gen. 3.3

##### Aims & Objectives:

This course provides the student with the principles of Human cytogenetics and molecular biology techniques. It demonstrates the practical applications of this technology in a diagnostic laboratory. Topics include, but are not limited to, DNA/RNA isolation, hybridization, Polymerase Chain Reaction, and restriction enzyme analysis.

Epi. 3.3

#### Introduction to Epidemiology

3 (Theoretical)

##### Aims & Objectives:

Principles and methods in the study of communicable and other diseases in space, overtime, and in populations. Factors related to their occurrence and case studies. Basic concepts of epidemiology, applied mortality and morbidity in Saudi Arabia. Approaches in disease cycles (host, man, environment).

This course will enable student to:

- Describe the incidence, morbidity and mortality of the major communicable and chronic diseases in Saudi Arabia.
- Analyze statistical evidence of factors in the occurrence of these diseases.
- Understand epidemiological methods in control of common diseases and disabilities.

Fst. 3.3

#### Independent Study

3 (Theoretical)

##### Aims & Objectives:

This course is a methodology and seminar presentation skill course in which students discuss clinical experiences and other topics related to clinical laboratory technology.

Hem. ١٣٠٣

Hematology Clinical Practice

٢ (٤practical)

Aims and Objectives:

This clinical rotation in blood banking provides the student the opportunity to learn and perform routine and analytical tests on human body specimens to provide accurate data to assist the healthcare team in diagnosis, treatment, prevention and monitoring of disease states.

Bio. ١٣٠٣

Biochemistry Clinical Practice

٢ (٤practical)

Aims & Objectives:

The Clinical Chemistry clinical rotation covers a composite of manual and automated procedures and exposure to the professional atmosphere found in a hospital lab. Students under supervision are involved in the analysis of patient samples and the quality control programs associated with acceptable laboratory standards.

This course will provide experience in a modern Clinical Chemistry laboratory along with weekly tutorials followed by comprehensive theoretical and practical examinations.

Mic ١٣٠٣

Microbiology Clinical Practice

٢ (٤practical)

Aims & Objectives:

In the third year as a part of a clinical laboratory education for Medical Laboratory Science students, have the opportunity to apply the theory and technical skills learned in the second year. In the clinical laboratories under supervision, the student will be involved in the processing and analysis of patient specimens, quality control programs and the general workings of the clinical microbiology laboratory.

This course will provide experience in a modern microbiology laboratory followed by comprehensive theoretical, oral and practical examinations.