

Study plan for the B.Sc.  
In Clinical Laboratory Sciences  
2016/2017

Degree name: B.Sc. in Clinical Laboratory Sciences

A. Plan constituents:

The study plan for the B. Sc. In Clinical Laboratory Sciences consists of (140) credit hours, as follows:

Numbering	Requirement	Credit Hours
First	University requirement	27
Second	Faculty requirement	21
Third	Specialty requirement	92
<b>Total</b>		<b>140</b>

B. Numbering system:

Departments' codes(1)

Number	Department
1	Mathematics
2	Physics
3	Chemistry
4	Biological sciences
5	Geology
8	Clinical Laboratory Sciences



Courses' codes:

Field Code	Specialization Address	Field Code	Specialization Address
0	Essentials & Ethics of Clinical Laboratory Profession	5	Microbiology, Parasitology, Mycology & Virology
1	Histology & Pathology	6	Hematology, Blood Bank, Immunology & Serology
2	Genetics & Molecular Biology	7	Laboratory Quality Control, Laboratory Results Correlation
3	Human Anatomy & Physiology & Endocrinology	8	Hospital Laboratory Training
4	General & Clinical Biochemistry, Metabolism, Laboratory Instrumentation	9	Seminar & Research

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0	3	0	8	2	3	1
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Faculty

department

level

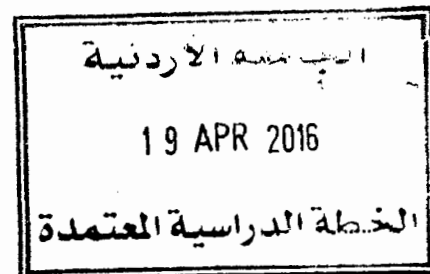
specialization

series

**Faculty requirement: (21) credit hours, divided to:**

1. obligatory requirement: (21) credit hours
2. Elective requirement: nothing

**1. Obligatory requirement: (21) credit hours**



Course #	Course Title	Theory	Practical	Credit Hours	Prerequisite
0301101	Calculus (1)	3	-	3	-
0301131	Principles of statistics	3	-	3	-
0302101	General physics (1)	3	-	3	-
0303101	General chemistry (1)	3	-	3	-
0304101	General Biology (1)	3	-	3	-
0305101	General geology	3	-	3	-
1931102	Computer skills for scientific faculties	3	-	3	1902099 1901098
0300010	University Ethics & Skills	1	-	-	-

**a. Elective requirement: nothing**

Specialty requirement: (92) credit hours, divided to:

1. Obligatory requirement: (87) credit hours

Course #	Course Title	Credit Hours			Prerequisite
		Total	Theory	Practical	
0303102	General chemistry (2)	3	3	-	0303101
0333109	Practical General chemistry for non-chemistry students	1	-	3	0303101 or concurrently
0333211	Analytical chemistry	3	3	-	0303102
0303216	Practical Analytical chemistry	1	-	3	0333211 + 0333109
0333233	Organic chemistry for non-chemistry students	3	3	-	0303102
0303239	Practical Organic chemistry for non-chemistry students	1	-	4	0333233
0304111	Practical General biology	1	-	3	0304101 or concurrently
0308101	Essentials & Ethics of Clinical Laboratory Profession	1	1	-	-
0308102	Medical Terminology	1	1	-	-
0308211	Histology	3	2	3	0304111
0308212	Histological Microtechniques	2	1	3	0308211 or concurrently
0308213	Pathology	3	3	-	0308211 or concurrently
0308231	Human Anatomy & Physiology	4	3	3	0308211 or concurrently
0308232	Endocrinology	2	2	-	0308231 or concurrently
0308241	Medical Laboratory Instrumentation & Techniques	2	2	-	-
0308242	General Biochemistry	4	3	3	0333233
0308251	General Microbiology	4	3	3	0333233
0308321	Molecular Biology	3	2	3	0308251 or concurrently
0308322	Diagnostic Genetics	3	2	3	0308321
0308343	Clinical Chemistry (1)	3	2	3	0308231 + 0308242
0308344	Clinical Chemistry (2)	2	2	-	0308343 or concurrently
0308352	Diagnostic Microbiology	3	2	3	0308251

0308353	Diagnostic Parasitology	3	2	3	0308251 or concurrently
0308354	Diagnostic Mycology	3	2	3	0308251 or concurrently
0308355	Medical Virology	2	2	-	الخطة او 0308251 او العتمة concurrently
0308361	Immunology & Serology	3	2	3	0308251+ 0308242
0308362	Hematology (1)	3	2	3	0308231
0308363	Hematology (2)	2	2	-	0308362 or concurrently
0308364	Blood Banking & Transfusion	3	2	3	0308361+ 0308363
0308471	Laboratory Quality Control & Management	2	2	-	0308344+ 0301131+0308363
0308481	Hospital Laboratory Training in Clinical Chemistry & Hormones	3	1	16	0308344+ 0308232
0308482	Hospital Laboratory Training in Hematology & Histological Techniques	3	1	16	0308363+ 0308212
0308483	Hospital Laboratory Training in Blood Banking & Transfusion	3	1	16	0308364
0308484	Hospital Laboratory Training in Microbiology, Parasitology & Immunology	3	1	16	0308352+ 0308353+ 0308361
0308491	Seminar	1	1	-	90 Credit Hours.

## 2. Elective requirement: (5) credit hours

Course #	Course Title	Credit Hours			Prerequisite
		Total	Theory	Practical	
0308445	Metabolism	3	3	-	0308242or0344321
0308472	Laboratory Results Correlation in Diseases	2	2	-	0308344+0308363
0364362	Embryology	3	2	3	0304102or0304101
0304383	Biotechnology	3	2	3	0304101
0334441	Applied Microbiology	3	2	3	0334341or0308251
0304466	Laboratory Animals	2	1	3	0364361or0308231
0308492	Laboratory research	2	-	16	Department approval

Guiding Plan for the students of Clinical Laboratory Sciences

First Year

الجامعة الأردنية

19 APR 2016

الخطة الدراسية للعام

First Semester			Second Semester		
Course #	Course Title	Credit Hours	Course #	Course Title	Credit Hours
0304101	General Biology (1)	3	0303102	General chemistry (2)	3
0302101	General Physics (1)	3	0301101	Calculus (1)	3
0303101	General Chemistry (1)	3	0301131	Principles of statistics	3
1931102	Computer skills for scientific faculties	3	0308101	Essentials & Ethics of Clinical Laboratory Profession	1
0304111	Practical General Biology1	1	0308102	Medical Terminology	1
	University requirement	3	0333109	Practical general chemistry for non-chemistry students	1
				University requirement	3
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>15</b>

First year summer

Summer Semester		
Course #	Course Title	Credit Hours
0333233	Organic chemistry for non-chemistry students	3
0303239	Practical Organic chemistry for non-chemistry students	1
0305101	General Geology	3
<b>Total</b>		<b>7</b>

Second Year

First Semester			Second Semester		
Course #	Course Title	Credit Hours	Course #	Course Title	Credit Hours
0333211	Analytical chemistry	3	0303216	Practical Analytical chemistry	1
0308211	Histology	3	0308231	Human Anatomy & Physiology	4
0308212	Histological Microtechniques	2	0308232	Endocrinology	2
0308213	Pathology	3	0308241	Laboratory Instrumentation & Techniques	2
0308251	General Microbiology	4	0308242	General Biochemistry	4
	University requirement	3	0308352	Diagnostic Microbiology	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>16</b>

Second Year Summer

Summer Semester		
Course #	Course Title	Credit Hours
0308355	Medical Virology	2
0308343	Clinical Chemistry (1)	3
<b>Total</b>		<b>5</b>

Third Year

First Semester			Second Semester		
Course #	Course Title	Credit Hours	Course #	Course Title	Credit Hours
0308344	Clinical chemistry (2)	2	0308322	Diagnostic Genetics	3
0308321	Molecular Biology	3	0308361	Immunology & Serology	3
0308353	Diagnostic Parasitology	3	0308362	Hematology (1)	3
0308354	Diagnostic Mycology	3	0308363	Hematology (2)	2
	University requirement	3		Elective specialty requirement	3
	University requirement	3		Elective specialty requirement	2
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>16</b>

Third Year Summer

Summer Semester		
Course #	Course Title	Credit Hours
0308364	Blood Banking & Transfusion	3
	University requirement	3
<b>Total</b>		<b>6</b>

Fourth Year

First Semester			Second Semester		
Course #	Course Title	Credit Hours	Course #	Course Title	Credit Hours
0308481	Hospital Laboratory Training in Clinical Chemistry & Hormones	3	0308483	Hospital Laboratory Training in Blood Banking & Immunology/Serology	3
0308482	Hospital Laboratory Training in Hematology & Histological Techniques	3	0308484	Hospital Laboratory Training in Microbiology & Parasitology	3
0308471	Laboratory Quality Control & Management	2	0308491	Seminar	1
	University requirement	3		University requirement	3
				University requirement	3
<b>Total</b>		<b>11</b>	<b>Total</b>		<b>13</b>



Courses taught by the Department of Clinical Laboratory Sciences

الجامعة الأردنية

19 APR 2016

Prerequisite

الخطة الدراسية المقترحة

Course #	Course title	Credit hours	Theory	Practical	Prerequisite
0308101	Essentials & Ethics of Clinical Laboratory Profession	1	1		
0308102	Medical Terminology	1	1	-	-
0308211	Histology	3	2	3	0304111
0308212	Histological Microtechniques	2	1	3	0308211 or concurrently
0308213	Pathology	3	3	-	0308211 or concurrently
0308231	Human Anatomy and Physiology	4	3	3	0308211 or concurrently
0308232	Endocrinology	2	2	-	0308231 or concurrently
0308241	Medical Laboratory Instrumentation & Techniques	2	2	-	-
0308242	General Biochemistry	4	3	3	0333233
0308251	General Microbiology	4	3	3	0333233
0308321	Molecular Biology	3	2	3	0308251 or concurrently
0308322	Diagnostic Genetics	3	2	3	0308321
0308343	Clinical chemistry (1)	3	2	3	0308231+ 0308242
0308344	Clinical chemistry (2)	2	2	-	0308343 or concurrently
0308352	Diagnostic microbiology	3	2	3	0308251
0308353	Diagnostic Parasitology	3	2	3	0308251 or concurrently
0308354	Diagnostic Mycology	3	2	3	0308251 or concurrently
0308355	Medical Virology	2	2	-	0308251 or concurrently
0308361	Immunology & Serology	3	2	3	0308251+ 0308242
0308362	Hematology (1)	3	2	3	0308231
0308363	Hematology (2)	2	2	-	0308362 or concurrently
0308445	Blood Banking & Transfusion	3	2	3	0308361+ 0308363
0308363	Metabolism	3	3	-	0308242
0308471	Laboratory Quality Control & Management	2	2	-	0308344+0301131 +0308363
0308472	Laboratory Results Correlation in Diseases	2	2	-	0308344+0308363
0308481	Hospital Laboratory Training in Clinical Chemistry & Hormones	3	1	16	0308344+0308232
0308482	Hospital Laboratory Training in Hematology	3	1	16	0308363+0308212

0308483	Hospital Laboratory Training in Blood Bank	3	1	16	0308364
0308484	Hospital Laboratory Training in Medical Microbiology	3	1	16	0308352+0308353 +0308361
0308491	Seminar	1	1	-	الخطة الدراسية العتمة 90 Credit Hours
0308492	Laboratory research	2	-	16	Department approval

الجامعة الأردنية  
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0308352+0308353  
+0308361  
الخطة الدراسية العتمة  
90 Credit Hours

Course description for the course taught by the Department of  
Clinical Laboratory Sciences  
BSc  
2016-2017

<b>0308101</b>	<b>Essentials &amp; Ethics of Clinical Laboratory Profession</b>	<b>Credit Hours :1</b>
	Prerequisite: -	
	The student will be introduced to the profession of medical laboratories and the clinical laboratory sciences, major disciplines in clinical laboratory sciences. Professional ethics, history, organization, certification, registration, licensure, regulatory agencies and governmental laws, basic concepts of laboratory practice introduced, including laboratory safety, phlebotomy, specimen processing, laboratory information systems, hospital and laboratory organization and certification. An introduction to the basic techniques in clinical laboratories, an overview that explains why laboratory tests are ordered and how interpretation of laboratory data is used in the care and welfare of patients. A field trip to visit a clinical laboratory is also included.	
<b>0308102</b>	<b>Medical Terminology</b>	<b>Credit Hours :1</b>
	Prerequisite: -	
	The student will learn to use the prefixes, suffixes and combining forms from which medical terms are derived by applying the rules for construction and analysis of medical terms and the rules for using medical suffixes, combining forms and prefixes. The student will also learn to use and interpret medical abbreviations.	
<b>0308211</b>	<b>Histology</b>	<b>Credit Hours :3</b>
	Prerequisite: 0304111	
	This course covers the following topics: types of tissues, characteristics, structural and functional aspects of the following tissues: epithelial, connective, cartilage, bone, blood, muscular and nervous. In addition, the course deals with study of histology of the following systems: integumentary; lymphoid, digestive, respiratory, excretory, reproductive, and endocrine. Also the study of cells, tissues and organs as seen through the microscope, which requires both an understanding of the structures and the ability to recognize them at a microscopic level.	
<b>0308212</b>	<b>Histological Microtechniques</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308211 or concurrently	
	The student will be introduced to the microtome and the principles and practices of preparing clinical specimens for histological examination. The course will focus on the procedures used in fixation, decalcification, processing, embedding and microtomy of specimens. major disciplines in medical laboratory sciences.	

<b>0308213</b>	<b>Pathology</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308211 or concurrently	
	The student will be introduced to the general concepts of disease, including etiology, pathogenesis, morphology, and clinical significance. General pathology concepts include: cell injury, necrosis, inflammation, wound healing, and neoplasia. These concepts are applied in a systems-oriented approach to disease processes affecting musculoskeletal, cardiopulmonary, renal, nervous, gastrointestinal, immune, and endocrine systems.	
<b>0308231</b>	<b>Human Anatomy &amp; Physiology</b>	<b>Credit Hours :4</b>
	Prerequisite: 0308211 or concurrently	
	This course is designed to provide students with an understanding of the function and anatomy relationship in regulation of the human body and physiology. The student will learn about the human anatomy in general. Course content will include neural and hormonal homeostatic control mechanisms, as well as study of the skeletal, muscular, cardiovascular, Lymphatic, respiratory, digestive, male and female reproductive and urinary organ systems. Molecular aspects of signal transduction mechanisms will be emphasized throughout the semester.	
<b>0308232</b>	<b>Endocrinology</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308231 or concurrently	
	The function and organization of the major endocrine glands in humans with emphasis on molecular endocrinology. It also includes the biosynthesis, secretion, metabolism, mechanism and physiological action of the hormones. Some endocrinological disorders, resulted from hyposecretion or hypersecretion of hormones will be studied.	
<b>0308241</b>	<b>Medical Laboratory Instrumentation &amp; Techniques</b>	<b>Credit Hours :2</b>
	Prerequisite: -	
	This course will provide a broad-based understanding of clinical laboratory instrumentation principles, their specific applications and the process of instrument selection as well as their calibration and maintenance to produce quality analysis, particularly the following instruments: spectrophotometers, ion-selective electrodes, thermal equipments, centrifuges and balances, turbidometers, hematology analyzers, coagulation instruments, clinical chemistry analyzers, osmometers, electrochemistry, electrophoresis, chromatography, molecular techniques, automation and immunochemical methodologies.	
<b>0308242</b>	<b>General Biochemistry</b>	<b>Credit Hours:4</b>
	Prerequisite: 0333233	
	This course concentrates on the acid base chemistry (especially Buffers) and the chemistry, function and metabolism of the major organic molecules which include amino acids, proteins, enzymes, carbohydrates, lipids and vitamins.	
<b>0308251</b>	<b>General Microbiology</b>	<b>Credit Hours:4</b>
	Prerequisite: 0333233	
	History and scope of microbiology ; prokaryotes cell structure and function; metabolism and nutrition , microbial growth, requirements for growth , environmental factors affecting growth, effect of antimicrobial agents on growth; microbial genetics, and gene cloning , bacterial reproduction, microbial taxonomy, major groups of bacteria, microorganisms and environment, elements cycling ; symbiotic associations; immune response and antigen – antibody reactions in vitro.	
<b>0308321</b>	<b>Molecular Biology</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308251 or concurrently	
	The lectures in this course covers the following topics; historical back ground; chemistry of nucleic acid; Watson-Crick model of DNA; physical and chemical properties of nucleic acids; an introduction to gene function (selection, transcription	

	and translation); transcription in prokaryotic cells; regulation of transcription in prokaryotic cells; transcription in eukaryotic cells; regulation of transcription in eukaryotic cells; general and specific transcription factors; post transcriptional events ; translation and the genetic code; post translational events; DNA replication in prokaryotic and eukaryotic cells; Mutation and DNA repair. the laboratory covers the following topics: Isolation of nucleic acids; quantitative and qualitative measurements of nucleic acids; the use of restriction enzymes; Amplification of nucleic acids; characterization and manipulation of the recombinant plasmid pGLO containing GFP gene; bacterial transformation and gene expression and protein produced isolation ; DNA-cloning and southern blot.	
<b>0308322</b>	<b>Diagnostic Genetics</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308321	
	This course is divided into four parts. The first part will cover Mendelian genetics, the molecular bases of Mendelian genetics and extensions of Mendelian genetics. The second part will cover chromosome mapping, sex determination and sex chromosomes, and chromosome mutations. The third part will cover extra nuclear inheritance, quantitative genetics and multifactorial traits. Finally, the fourth part will cover the molecular genetics of some popular human disorders, genetic testing in individuals and populations, human biochemical disorders, gene therapy, hereditary defects with altered drug responses, genetic counseling. This course includes two lectures and one laboratory session, which includes experiments dealing with mitosis, working and crossing <i>Drosophila</i> and other genetics illustrating experiments.	
<b>0308343</b>	<b>Clinical Chemistry (1)</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308242+0308231	
	Essentials of clinical chemistry that related to the biochemical basis of diseases and the principals of laboratory diagnosis particularly in the following conditions; Disorders of carbohydrate, lipid, protein and amino acid metabolism. Clinical enzymology. Assessment of liver functions. Assessment of cardiovascular disorders, with emphasis on laboratory detection and clinical correlation of these disorders.	
<b>0308344</b>	<b>Clinical Chemistry (2)</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308343 or concurrently	
	Mechanisms for water, electrolyte and acid/base balance and imbalance discussed in association with renal and respiratory functions and blood gases. Calcium and phosphate regulation and disorders. Assessment of nutrition and digestive function. Malignancy disorders and testing.	
<b>0308352</b>	<b>Diagnostic Microbiology</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308251	
	The course will cover the bacterial pathogenicity interwoven with an understanding of host defense mechanisms, epidemiology, prevention, control and treatment of human infectious diseases. The Lectures and laboratory sessions will focus as well on the diagnostic procedures used for isolation, identification, and antimicrobial susceptibility testing of the microorganisms associated with disease. Specimen types from different anatomical sites will be covered for the culture of bacteria in the clinical laboratory.	
<b>0308353</b>	<b>Diagnostic Parasitology</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308251 or concurrently	
	This course is a study of medically important human parasites, including mode of transmission, pathogenic conditions and defense mechanisms of the host, and techniques for clinical laboratory diagnosis and identification.	
<b>0308354</b>	<b>Diagnostic Mycology</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308251 or concurrently	
	This course is a study of the medically important fungi, including mode of	

	for clinical laboratory diagnosis and identification.	and relative techniques
<b>0308355</b>	<b>Medical Virology</b>	<b>Credit Hours:2</b>
	Prerequisite: 0308251 or concurrently	
	Virus structure, viroids, satellites, prions, virus evolution, multiplication of viruses, virus taxonomy, viral pathogenesis, viral persistent, latency, patterns of some viral diseases of human, cell transformation by viruses, host-immune response to viral infections, interferons, antiviral agents, immunization and vaccination. Virus structure, viroids, satellites, prions, virus evolution, multiplication of viruses, virus taxonomy, viral pathogenesis, viral persistent, latency, patterns of some viral diseases of human, cell transformation by viruses, host-immune response to viral infections, interferons, antiviral agents, immunization and vaccination.	مضاعفة الفيروسات
<b>0308361</b>	<b>Immunology &amp; Serology</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308242+0308251	
	This course will focus on the cells, organs and molecules of the immune system and how they contribute to discrimination of antigens and how the host response to infectious agents. Hypersensitivity, autoimmunity, graft rejection and tumor immunity will be considered as variations in the basic protective function of the immune system. It will also provide knowledge about the basic immune system and principles of antigen-antibody reactions and their application in many laboratory tests. Serological diagnostic procedures.	
<b>0308362</b>	<b>Hematology (1)</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308231	
	Theory and application of hematology tests performed routinely in the clinical laboratory. Hematopoiesis. Counting and identification of blood cells including erythrocytes, leukocytes and platelets. Hemoglobin production disorders and Testing. Metabolism of iron, folate and B12. Disorders of red blood cells. The pathophysiology of various anemias as related to the laboratory involvement in diagnosis and treatment and the special laboratory tests used for differential diagnosis.	
<b>0308363</b>	<b>Hematology (2)</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308362 or concurrently	
	Disorders of white blood cells. The pathophysiology of leukemias as related to the laboratory involvement with diagnosis and treatment and the special laboratory tests used for differential diagnosis. Disorders of platelets. Hemostasis systems, their function, interaction, and monitoring. Principles and procedures of routine and special hemostasis assays and the tests used to evaluate common abnormalities in coagulation and fibrinolysis. Hemostatic disorders and correlation of hemostasis assay results with various bleeding disorders. Thrombosis and anticoagulant therapy.	
<b>0308364</b>	<b>Blood Banking &amp; Transfusion</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308363 + 0308361	
	The theory and practice needed to perform basic techniques which include antigen-antibody reactions, ABO forward and reverse grouping, Rh grouping, the antiglobulin test (direct and indirect) and other blood group systems and procedures used to detect and identify antigens and antibodies. Diagnosis, treatment and prevention of hemolytic disease in newborns. The theory and practice needed to provide and issue compatible products for transfusions and the investigating of adverse effects of transfusions.	
<b>0308445</b>	<b>Metabolism</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308242 or 0344321	
	This course deals with the various aspects of breakdown and synthesis of the main	



	bioorganic compounds. This includes carbohydrates, proteins, lipids and nucleic acids. The main focus will be on the generation and consumption of energy. The overall coordination of the various metabolic pathways will be stressed.	APR 2016
0308471	<b>Laboratory Quality Control &amp; Management</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308344 + 0308363+ 0301131	
	This course is intended to teach the student the ways and means by which health care providers such as clinician and laboratory staff collect proper human samples, perform tests effectively and obtain reliable and relevant data with maximal benefit to the patient and community and minimal risk to themselves. The student will receive a complete overview of methods used to ensure quality patient management, quality assurance and quality control techniques. The course will include quality assurance of preanalytical, analytical and postanalytical phases, the application of internal and external quality assessment programmes, international accreditation standards and the skills required for management roles, budget planning, safety precautions, sterilization and disinfection.	
0308472	<b>Laboratory Results Correlation in Diseases</b>	<b>Credit Hours :2</b>
	Prerequisite: 0308344+ 0308363	
	This course will focus on the role of the laboratory in diagnosis and disease management. The course content includes the analyses used and brief descriptions of common disorders involving the various body systems. The student will use this information to detect possible discrepancies in laboratory test results as part of quality management and to help hem define the role of the laboratory in disease diagnosis and management.	
0308481	<b>Hospital Laboratory Training in Clinical Chemistry &amp; Hormones</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308344 + 0308232	
	The student will be trained 16 hours weekly (two working days) during the first or second semester (15 weeks) of fourth year in a recognized hospital laboratory. The student will work along with laboratory personnel, learning daily routines, technical procedures and proper use of various types of laboratory equipment. The training will include routine and special tests in clinical chemistry, endocrinology, urine chemistry and molecular biology. The students will be supervised by a departmental member who will visit them in hospital regularly and also meet them in the department for a formal one hour lecture during which the students will make short presentations relating to case studies from their hospital training. At the end of the semester the student should pass written and oral exams, with the graduate mark being pass or fail.	
0308482	<b>Hospital Laboratory Training in Hematology &amp; Histological Microtechniques</b>	<b>Credit Hours :3</b>
	Prerequisite: 0308363 + 0308212	
	The student will be trained 16 hours weekly (two working days) during the first or second semester (15 weeks) of fourth year in a recognized hospital laboratory. The student will work along with laboratory personnel, learning daily routines, technical procedures and proper use of various types of laboratory equipment. The training will include routine and special tests in hematology and histology as well as phlebotomy and reception training. The students will be supervised by a departmental member who will visit them in hospital regularly and also meet them in the department for a formal one hour lecture during which the students will make short presentations relating to case studies from their hospital training. At the end of the semester the student should pass written and oral exams, with the graduate mark being pass or fail.	

0308483	<b>Hospital Laboratory Training in Blood Banking &amp; Transfusio</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308364	
	<p>The student will be trained 16 hours weekly (two working days) during the first or second semester (15 weeks) of fourth year in a recognized hospital laboratory. The student will work along with laboratory personnel, learning daily routines, technical procedures and proper use of various types of laboratory equipment. The training will include routine and special tests in blood bank, immunopathology/serology. The students will be supervised by a departmental member who will visit them in hospital regularly and also meet them in the department for a formal one hour lecture during which the students will make short presentations relating to case studies from their hospital training. At the end of the semester the student should pass written and oral exams, with the graduate mark being pass or fail.</p>	
0308484	<b>Hospital Laboratory Training in Microbiology, Parasitology &amp; Immunology</b>	<b>Credit Hours:3</b>
	Prerequisite: 0308352 + 0308353 + 0308361	
	<p>The student will be trained 16 hours weekly (two working days) during the first or second semester (15 weeks) of fourth year in a recognized hospital laboratory. The student will work along with laboratory personnel, learning daily routines, technical procedures and proper use of various types of laboratory equipment. The training will include routine and special tests in medical Microbiology, Parasitology, mycology, Immunology and urine and stool microscopy. The students will be supervised by a departmental member who will visit them in hospital regularly and also meet them in the department for a formal one hour lecture during which the students will make short presentations relating to case studies from their hospital training. At the end of the semester the student should pass written and oral exams, with the graduate mark being pass or fail.</p>	
0308491	<b>Seminar</b>	<b>Credit Hours:1</b>
	Prerequisite: 90 Credit Hours	
	<p>The student will choose a recent scientific topic using net search to learn reference collection, reference organization, write an abstract with references, make slides for data show presentation and present a short talk using the collected data followed by discussion with class students.</p>	
0308492	<b>Laboratory Research</b>	<b>Credit Hours:2</b>
	Prerequisite: Department approval	
	<p>The student chooses a research project in one of the fields of biomedical sciences, which he/she must complete and write in an acceptable scientific manner during the semester (Only students with total average of good and above are allowed to register for this course).</p>	

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