

<b>0301211</b>	<b>Medical Terminology</b>	<b>1 CH</b>	<b>1</b>	<b>0</b>	Prereq: 0201101
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This course provides the technical terms used in the medical field and how to pronounce them by knowing the meaning of the roots, prefixes, suffixes and combining forms. It will help the students to understand the basic rules and terms related to body structure, medical science, hospital service, and the allied health specialties.

<b>0301212</b>	<b>Clinical Laboratory Orientation</b>	<b>1 CH</b>	<b>1</b>	<b>0</b>	Prereq: 0201101
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This course covers the theoretical and practical application of clinical duties of the medical technologist working in a hematology laboratory department, urinalysis, body chemistry, and microbiology. It also covers other topics; laboratory orientation, procedures and techniques, and an introduction to clinical laboratory instrumentation.

<b>0301213</b>	<b>Pathophysiology</b>	<b>3 CH</b>	<b>3</b>	<b>0</b>	Prereq: 0301221
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This course introduces the student to the basic mechanisms of diseases, organs affected and the response of normal tissues to injury. It provides a comprehensive and yet, concise account of the important features of disease and to link, where possible, the pathological changes with effects on the patients. This helps students to have an overview of most aspects of pathology, explains the mechanisms of disease processes and provides a strong emphasis on clinic-pathological correlation, which might be helpful in differential diagnosis.

<b>0301221</b>	<b>Human Physiology</b>	<b>3 CH</b>	<b>3</b>	<b>0</b>	Prereq: 0304131+ Concurrent 0301226
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The course provides the students with knowledge about the normal functions and mechanism of various physiological systems (cardiovascular, respiratory, renal, endocrine, neural and gastrointestinal) as well as basic concepts of cellular physiology.

<b>0301226</b>	<b>Human Physiology Laboratory</b>	<b>1 CH</b>	<b>0</b>	<b>3</b>	Prereq: Concurrent 0301221
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This laboratory course is a complementary practical work of the human physiology and must be taken in conjunction with the Human Physiology (301221). The course is designed to illustrate principles of human physiology and the structure and functions of the human body and training in physiological techniques.

<b>0301231</b>	<b>Laboratory Management</b>	<b>2 CH</b>	<b>2</b>	<b>0</b>	Prereq: None
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This course teaches students how to maintain an active medical laboratory. It specifies the processes and duties involved with laboratory organization such as the maintenance of lab supplies and equipment, regulations and safety policies, using computers to record data and proper use of medical instruments.

<b>0301232</b>	<b>Biochemistry</b>
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<b>3 CH</b>	Prereq:	0902101
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<b>3</b>	<b>0</b>
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The course emphasizes human biochemistry in both health and disease and 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. Students examine the structure of proteins, their function, binding to other molecules and the methodologies for the purification and characterization of proteins. Enzymes and their kinetics and mechanisms are covered in detail. Metabolic pathways are examined from thermodynamic and regulatory perspectives. This course emphasizes human biochemistry in both health and disease.

<b>0301233</b>	<b>Molecular Genetics</b>
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<b>3 CH</b>	Prereq:	0201101
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<b>3</b>	<b>0</b>
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The course emphasizes the molecular basis of cellular processes. It includes the identification of human genes and genetic disorders, covering the mechanism of mutation that leads to those disorders, as well as methods applied to diagnose them.

<b>0301241</b>	<b>Basic Microbiology Laboratory</b>
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<b>1 CH</b>	Prereq	Concurrent
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<b>0</b>	<b>3</b>
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The course covers basic techniques of media preparation, aseptic techniques, how to grow and identify microorganisms based on culture features, staining, and biochemical metabolic differences. It enables student to identify a mixture of more than two microorganisms.

<b>0301251</b>	<b>Phlebotomy and Laboratory Safety</b>
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<b>1 CH</b>	Prereq	0301212
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<b>1</b>	<b>0</b>
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This course provides an introduction and practical experience on locating and assessing skin puncture, arterial draws, venipuncture sites, and capillary puncture methods for adults and children and infants from patients in medical settings.

<b>0301252</b>	<b>Immunology</b>
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<b>2 CH</b>	Prereq	0304231
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<b>2</b>	<b>0</b>
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This course concentrates on the basic structure and function of the reticulo-endothelial system and the role of its organs and cells in defense against foreign substances, antigens and antibodies, immune mechanisms in health and diseases, antigen-antibody reactions in vivo and in vitro, immune deficiency, transplantation, and vaccines.

<b>0301311</b>	<b>Histological Techniques</b>
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<b>1 CH</b>	Prereq	0310226
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<b>0</b>	<b>1</b>
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The course concentrates on the bases of routine histology methods and the elementary principles, constituents and use of apparatuses in the histopathology laboratory.

<b>0301321</b>	<b>Analysis of Body Fluids</b>	<b>1 CH</b>	<b>Prereq:</b>	0304218
		<b>1</b>	<b>0</b>	

The course concentrates on the macroscopic and microscopic analysis of various body fluid samples in health and disease, including urine, seminal fluid, CSF, sputum, stool, synovial fluid, peritoneal, pericardial, and pleural fluid, and their compositions in health and pathological conditions.

<b>0301322</b>	<b>Molecular Endocrinology</b>	<b>2 CH</b>	<b>Prereq:</b>	0301232
		<b>2</b>	<b>0</b>	

This course emphasizes molecular and cellular effects of hormones in health and disease, hormone-receptor interaction; synthesis, transport and targeting of hormones, growth factors, and hormonal disorders in diabetes, hypertension, osteoporosis and cancer.

<b>0301326</b>	<b>Analysis of Body Fluids Laboratory</b>	<b>1 CH</b>	<b>Prereq:</b>	Concurrent 0301321
		<b>0</b>	<b>3</b>	

The course covers principles and standard techniques involved in laboratory analysis of body fluids, including, cerebral spinal fluid, synovial fluid, seminal fluid, urine, pleural, peritoneal, pericardial, stool and sputum; their normal characteristics and pathological changes in diseases. There are some case studies emphasizing the correlation of results with pathological status.

<b>0301331</b>	<b>Clinical Biochemistry-1</b>	<b>2 CH</b>	<b>Prereq:</b>	0301232
		<b>2</b>	<b>0</b>	

This course studies the biochemical alterations arising in the human body due to numerous diseases and the valuation of disorders in sugars, proteins, lipids, enzymes, non-protein nitrogen products, bile pigments and mineral metabolism in addition to electrolytes, blood gases and acid base balance.

<b>0301332</b>	<b>Clinical Biochemistry-2</b>	<b>2 CH</b>	<b>Prereq:</b>	0301331
		<b>2</b>	<b>0</b>	

This course focuses on clinical significance and approaches of investigation of hormones and metabolites, trace elements, vitamins, therapeutic drugs, toxicology, and laboratory calculation as well as the diagnostic measures that help in assessing the competence of diverse body organs.

<b>0301336</b>	<b>Clinical Biochemistry-1 Laboratory</b>	<b>1 CH</b>	<b>Prereq:</b>	Concurrent 0301331
		<b>0</b>	<b>3</b>	

The course provides the student with the skills of analyzing various biochemical constituents of body fluids such as enzymes, serum proteins, amino acids and non-protein nitrogen compounds, sugars, lipid and lipid profiles.

<b>1 CH</b>	<b>Prereq:</b>	Concurrent 0301332
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<b>0301337</b>	<b>Clinical Biochemistry-2 Laboratory</b>	<b>0</b>	<b>3</b>
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This course deals with the useful application of clinical biochemistry in blood gas analysis, electrolyte and acid– base balance, liver function test; kidney function test; calcium and phosphorus, iron, trace element, hormones, drugs , toxicology and vitamins.

<b>2 CH</b>	<b>Prereq:</b>	0304231
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<b>0301341</b>	<b>Clinical Microbiology-1</b>	<b>2</b>	<b>0</b>
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This course introduces the student to microorganisms leading to disease development with emphasis on the study of morphology, physiology, biochemistry, molecular biology, epidemiology, pathogenesis, diagnostic aspects and treatment of medically important bacteria.

<b>2 CH</b>	<b>Prereq:</b>	0301341
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<b>0301342</b>	<b>Clinical Microbiology-2</b>	<b>2</b>	<b>0</b>
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The course concentrates on the diseases caused by pathogenic microorganisms, collection, storage, and transport of samples of diagnostic value, and implementation of international standard methodology for the isolation, identification, antimicrobial susceptibility testing, and reporting of results to physicians, health authorities, and infection control committees for contagious diseases

<b>2 CH</b>	<b>Prereq:</b>	0304231
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<b>0301343</b>	<b>Medical Parasitology</b>	<b>2</b>	<b>0</b>
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This course is a comprehensive study of the parasites of humans, emphasizing parasite structure, life cycle, epidemiology, disease development, symptoms, diagnostic samples, prevention and control.

<b>2 CH</b>	<b>Prereq:</b>	0304231
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<b>0301344</b>	<b>Medical Virology</b>	<b>2</b>	<b>0</b>
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This course provides a basic understanding of the biochemical and molecular mechanism of viral infection by studying viral replication, virulence, host-parasite relationships, molecular mechanisms of infection, and the host response to infections. It also provides the tools to diagnosis viral infections, vaccines and control of viral infections.

<b>1 CH</b>	<b>Prereq:</b>	Concurrent 0301342
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<b>0301347</b>	<b>Clinical Microbiology-2 Laboratory</b>	<b>0</b>	<b>3</b>
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The course concentrates on the technical laboratory diagnosis of human infectious diseases. It provides students skills to perform microbiological cultivation of pathogens from clinical specimens utilizing quality controlled standard procedures and techniques, conventional and

non-conventional methods, accurate reporting and interpretation of the findings. It includes the implementation of professional ethics

<b>1 CH</b>	Prereq:	Concurrent 0301343
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<b>0301348</b>	<b>Medical Parasitology Laboratory</b>
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<b>0</b>	<b>3</b>
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This course concentrates on the laboratory methods and diagnostic features and samples for identification of parasites of medical importance using prepared slides. Clinical specimens will be provided to students when available to stain, examine and identify the parasites when present.

<b>3 CH</b>	Prereq:	0301221
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<b>0301351</b>	<b>Basic Hematology</b>
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This course offers a learning of the hematopoietic system, and its association to other organ systems, erythropoiesis and leucopoiesis in health and illness, coagulation tests, as well as the estimation of the normal values of blood cells, and hemoglobin.

<b>2 CH</b>	Prereq:	0301351
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<b>0301353</b>	<b>Clinical Hematology</b>
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<b>2</b>	<b>0</b>
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This course offers a broad study of hemostasis abnormalities, thrombosis, determination of blood sedimentation rates, numerous diagnostic tests for leukocyte, platelets, and coagulation disorders, anemia, leukemia, lymphocytic and myelo-proliferative disorders.

<b>1 CH</b>	Prereq:	Concurrent 0301353
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<b>0301358</b>	<b>Clinical Hematology Laboratory</b>
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This course provides a complete clarification on the usage of specialized hematologic tests in the diagnosis of blood cell disorders. Students apply knowledge and skills to interpret lab results, and use a problem solving approach as they read case studies.

<b>3 CH</b>	Prereq:	0301213
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<b>0301411</b>	<b>Introduction to Clinical Pathology</b>
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This course deals with the diagnosis of disease based on the laboratory investigations of bodily fluids such as blood, urine, and tissues.

<b>3 CH</b>	Prereq:	0301332
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<b>0301421</b>	<b>Clinical Endocrinology</b>
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This course studies the endocrine system in relation to its function, disorders and diseases. It will emphasize the epidemiology, risk factors, impacts and establishment of diagnosis of different diseases such as calcium metabolic diseases, obesity, diabetes mellitus, and cardiovascular risk factors.

<b>0301422</b>	<b>Seminar in Physiology and Endocrinology</b>	<b>1 CH</b>	<b>1</b>	<b>0</b>	Prereq: 0301342
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The course provides recent knowledge for interpretation and correlation of laboratory data to patient care and builds critical thinking and problem solving skills. Students are encouraged to present a topic selected from recent literature that reports new areas of research and its uses in clinical laboratory sciences, particularly physiology and endocrinology.

<b>0301436</b>	<b>Clinical Urinalysis Laboratory/ Hospital Laboratory Practice</b>	<b>1 CH</b>	<b>-</b>	<b>3</b>	Prereq: 0301332
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This course provides standard methods of macroscopic and microscopic urine examination for physical, chemical, and cellular elements, and stresses the importance of urine analysis in health and pathological conditions.

<b>0301442</b>	<b>Laboratory Education and Management</b>	<b>1 CH</b>	<b>1</b>	<b>0</b>	Prereq: 0301212
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This course provides several subjects linked to laboratory tasks, ethics, teamwork, laboratory safety; infection control, patient safety orientation, communication, professional development, interview skills, laboratory budget, laboratory information systems; quality assessment, and work flow.

<b>0301451</b>	<b>Clinical Immunology and Serology</b>	<b>3 CH</b>	<b>3</b>	<b>0</b>	Prereq: 0301252
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This course integrates basic and clinical immunology featuring theories and techniques of clinical immunology, relationships between infection and immunity, immunopathology, diagnostic techniques, and treatment of immunologically related diseases.

<b>0301452</b>	<b>Blood Bank – Immunoematology</b>	<b>3 CH</b>	<b>3</b>	<b>0</b>	Prereq: 0301353
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The course offers the knowledge and abilities necessary to study human blood groups, blood group genetics, hemolytic disease, transfusion therapy, current blood bank practice, and the performance of clinical laboratory techniques and the understanding of results.

<b>0301456</b>	<b>Clinical Immunology and Serology Lab</b>	<b>1 CH</b>	<b>0</b>	<b>3</b>	Prereq: Concurrent 0301451
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The course introduces the student to common serological testing used in a clinical lab comprising agglutination reaction, precipitation reaction, complement fixation test, indirect hemagglutination, hemagglutination inhibition test, Elisa, and more.

		<b>1 CH</b>	Prereq:	Concurrent 0301452
<b>0301457</b>	<b>Blood Bank – Immunoematology Lab</b>	<b>0</b>	<b>3</b>	

The course covers the study of blood group antigens and antibodies related to the ABO and Rh systems and other major blood group systems, identification of factors responsible for mismatches and the investigation of methods for blood processing, management and storage.

		<b>3 CH</b>	Prereq:	Completion of 90 credit hours
<b>0301471</b>	<b>Biochemistry /Hospital Laboratory Practice</b>	<b>-</b>	<b>9</b>	

This course deals with instructions and practices of laboratory measures in clinical biochemistry and automation in an appropriate hospital laboratory. It is an application of material learned in the clinical biochemistry courses.

		<b>3 CH</b>	Prereq:	Completion of 90 credit hours
<b>0301472</b>	<b>Clinical Microbiology/Hospital Laboratory Practice</b>	<b>-</b>	<b>9</b>	

This course practices techniques in an appropriate hospital laboratory for processing specimens for the isolation and identification of various microbe causing diseases in addition to techniques for antimicrobial susceptibility testing.

		<b>2 CH</b>	Prereq:	Completion of 90 credit hours
<b>0301473</b>	<b>Blood Bank Laboratory/ Hospital Laboratory Practice</b>	<b>-</b>	<b>6</b>	

This training course offers instructions and practice of laboratory procedures in a blood bank in an appropriate hospital laboratory.

		<b>3 CH</b>	Prereq:	Completion of 90 credit hours
<b>0301474</b>	<b>Immunology and Serology/Hospital Laboratory Practice</b>	<b>-</b>	<b>9</b>	

This training course offers instructions and practice of laboratory procedures in immunology/serology in an appropriate hospital laboratory.

<b>0301475</b>	<b>Clinical Microscopy/ Hospital Laboratory Practice</b>	-	<b>3</b>	<b>1 CH</b> Prereq:	Completion of 90 credit hours
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This training course offers instructions and practice of laboratory procedures in an appropriate hospital laboratory. It covers identification of blood diseases, chemical and microscopic examination of body fluids such as urine, synovial, cerebrospinal, peritoneal, pericardial, and pleural fluids, and certain tissues.

		<b>3 CH</b>	Prereq:	0201101
<b>0303111</b>	<b>Fundamentals of Nutrition</b>	<b>3</b>	<b>0</b>	

Chemical composition of macro- and micronutrients as well as the human needs of them and their implication on health. Basic principles of nutrition, especially nutrients needed to maintain individual physiological status and the disorders caused by their deficiencies; sources of nutrients with focus on healthy eating habits and different diets.

		<b>3 CH</b>	Prereq:	0201101+ 0902101
<b>0303240</b>	<b>Food Science</b>	<b>3</b>	<b>0</b>	

This Food Science course aims to put students at the first step toward building a scientific background about food composition, the chemical structure and physical properties of nutrients, and the functional role of food composition. An introduction to food deterioration and its prevention by using different food additives, physical, chemical and biological means. Principles of quality control and sensory evaluation of food are also discussed.

		<b>3 CH</b>	Prereq:	0304231+ 0303240
<b>0303241</b>	<b>Food Microbiology</b>	<b>3</b>	<b>0</b>	

This course deepens the knowledge of microbiological issues related to food quality, discussing factors affecting the growth of microorganisms in foods and the roles they play in food preservation and processing with emphasis on biotechnology. Student will learn about food-borne illnesses and proper hygienic practices during the handling and processing of foods.

		<b>1 CH</b>	Prereq:	Concurrent 0303241
<b>0303246</b>	<b>Food Microbiology Laboratory</b>	<b>0</b>	<b>3</b>	

This lab includes microbial analysis of microorganism related to food spoilage; their microbial content and load. It includes testing of selected raw and processed foods for their microbial quality using microscopic, biochemical and other methods. It also includes application of hygienic principles to food preparation, service and processing establishments. Methods of sampling, tabulation and interpreting the data and results is also included.

		<b>3 CH</b>	Prereq:	0303111+ 0301232
<b>0303321</b>	<b>Metabolic and Eating Disorders</b>	<b>3</b>	<b>0</b>	

Discuss the chemical reactions that occur within the body, including metabolism, anabolism and catabolism. Explain how the body metabolizes the different nutrients and what happens in the body during feasting and fasting. Explain the basal metabolic rate and factors affecting it. Different diseases related to metabolic disorders and the regimens used in treating these disorders.

		<b>3 CH</b>	Prereq:	0303321
<b>0303331</b>	<b>Dietetics</b>	<b>3</b>	<b>0</b>	

This course focuses on the management of diet. Also focuses on the use of food in planning and preparation of normal and modified diets in health and disease. Concentrate on the different types of diets, characteristics and how to be prepared and to be use in different diseases, based on proper health and scientific methods. Selected diseases will be described and the suitable diet to be used for them according to the symptoms and complications to be planned.

		<b>1 CH</b>	Prereq:	Concurrent 0303331
<b>0303336</b>	<b>Dietetics Lab</b>	<b>0</b>	<b>3</b>	

This course includes steps to be taken in consideration for planning and formulation of different diets for ordinary and with special dietary needs subjects. It also includes training on using the nutrition software, exchange list, food pyramid, and food composition tables. Concentration on calculations of energy- producing nutrients in different food items using the mentioned methods.

		<b>3 CH</b>	Prereq:	0303241
<b>0303341</b>	<b>Food Hygiene</b>	<b>3</b>	<b>0</b>	

This course includes basic principles of food hygiene practices and different food-borne illnesses and hazards transmitted to food including pathogenic, spoilage microorganisms, food toxins and pollutants. Also discussed are quality management systems to ensure food hygiene such as the HACCP system, GMP, GAP and ISO 22000.

		<b>2 CH</b>	Prereq:	0303240+ 0304213
<b>0303342</b>	<b>Food Chemistry and Analysis</b>	<b>2</b>	<b>0</b>	

This course deepens knowledge in food science through learning the chemistry behind food groups and the reactions, chemical components of foods items, food analysis, the effect on quality, the changes they undergo during processing and handling. They also learn the chemistry of food additives, antioxidants and link it to health issues.

		<b>2 CH</b>	Prereq:	0303240
<b>0303344</b>	<b>Food Processing and Preparation</b>	<b>2</b>	<b>0</b>	

This course focuses on processing of the major food groups; i.e cereals, meats, and fruits and vegetables. Also explored are different methods of processing, and preparation of food types, like baked goods, frying, and boiling. It includes learning proper methods of preservation and meal preparation.

			<b>1 CH</b>	Prereq:	Concurrent 0303342
<b>0303347</b>	<b>Food Chemistry and Analysis Lab</b>	<b>0</b>	<b>3</b>		

The lab part includes proximate analysis and different food analytical methods and application of official standards to identify the selected food items by analytical and instrumental lab methods.

			<b>1 CH</b>	Prereq:	Concurrent 0303344
<b>0303349</b>	<b>Food Processing and Preparation Lab</b>	<b>0</b>	<b>3</b>		

Lab includes practical application of the preparation methods taught in the theoretical background. Student will learn food measuring techniques and interpret their calculations, prepare meals and some food items representing the various food groups such as fruits and vegetables, meat products, fats and oils, cereals and dairy products.

			<b>3 CH</b>	Prereq:	0303111
<b>0303351</b>	<b>Nutrition Counseling</b>	<b>3</b>	<b>0</b>		

This course provides guidelines for nutrition and dietetics practices. It provides hands on experiences in developing communication, counseling and interviewing skills. The course focuses on counseling for behavior modification and cognitive change, realizing differences between verbal and non-verbal communication techniques.

			<b>2 CH</b>	Prereq:	Concurrent 0303331
<b>0303352</b>	<b>Assessment of Nutritional Status</b>	<b>2</b>	<b>0</b>		

This course focuses on the importance of good nutrition to health and concentrate on the standards for nutrient intake and how to measure the diet using different techniques. Also clarifies the different methods for nutritional assessment such as anthropometric, biochemical, clinical and dietary methods, and to evaluate individual's and community nutritional status, and also the nutritional assessment of hospitalized patients.

			<b>3 CH</b>	Prereq:	Concurrent 0303331
<b>0303353</b>	<b>Nutrition and Nutrition Disorders</b>	<b>3</b>	<b>0</b>		

This course focuses on the main nutritional disorders related to deficiency in major macronutrients and micronutrients. Weight management, obesity and overweight and their consequences on health, e.g. diabetes mellitus and metabolic syndrome are discussed. The course also describes the nutritional consequences of severe micronutrient deprivation and their relation to different diseases e.g. osteoporosis and hypothyroidism.

<b>0303354</b>	<b>Clinical Nutrition for Children</b>	<b>3</b>	<b>CH</b>	Prereq:	3033310
		<b>3</b>	<b>0</b>		

This course deals with nutritional care for children who suffer from different diseases and designing special nutritional programs for them. Medical nutrition therapy for low-birth-weight infants and different feeding methods will be discussed. Also discussed is identifying genetic metabolic disorders and the role of the nutritionist in them.

<b>0303357</b>	<b>Assessment of Nutritional Status Lab</b>	<b>0</b>	<b>3</b>	<b>1 CH</b>	Prereq	Concurrent 0303352
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Includes different assessment activities such as anthropometric tests (estimating stature and body weight, different skinfold measurements using calipers), and biochemical tests (studying different profiles such as chemistry, complete blood count and coronary risk profile) as indicators of the nutritional status. It also includes exercises in the use of growth charts for ideal status of children and grownups of both sexes, and food composition tables for the assessment of nutritional status and the relation of good health status to balanced nutrition. Different assessment activities such as 24-hour recall and questionnaires (diet history and food frequency questionnaires) are focused on.

<b>0303358</b>	<b>Nutrition and Nutrition Disorders Lab</b>	<b>0</b>	<b>3</b>	<b>1 CH</b>	Prereq	Concurrent 0303353
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This course enables students to provide therapeutic diets related to macro and micro nutrients deficiencies and to deal with different cases using the systematic scientific methods of malnutrition prevention and diagnosis.

<b>0303361</b>	<b>Computer Applications in Clinical Nutrition and Dietetics</b>	<b>3</b>	<b>0</b>	<b>3 CH</b>	Prereq:	0303331+ 0900180
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This course deals with theoretical and practical application of computer software programs in clinical nutrition and dietetics such as nutrient analysis and statistical methods. Also discussed is the use of computer searches for diet plans and nutritional information from the Internet.

<b>0303431</b>	<b>Seminar in Nutrition and Dietetics</b>	<b>1</b>	<b>0</b>	<b>1 CH</b>	Prereq:	Completion of 96 Cr
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The student chooses a current topic in nutrition and dietetics and discusses it in an article using recent references and presents it for an hour using audiovisual aids. Emphasis is placed on new developments in the field. Students are trained in the proper use of library references.

		<b>3 CH</b>	Prereq:	0303344
<b>0303441</b>	<b>Food System Management</b>	<b>3</b>	<b>0</b>	

This course deals with basic principles of institutional food service systems. It discusses methods of food and equipment purchasing, menu planning, quality assurance, and management of a feeding establishment. Other major topics are financial planning of staff food services and the application of food quality systems to institutions.

		<b>3 CH</b>	Prereq:	0303331
<b>0303451</b>	<b>Therapeutic Nutrition</b>	<b>3</b>	<b>0</b>	

This course deals with introduction to diet therapy for different disease conditions. The medical nutrition therapies for diseases are discussed in terms of etiology, pathophysiology, and medical and nutrition management (Gastrointestinal tract, liver, kidney, heart, thyroid gland, and pulmonary, neurological, psychiatric, HIV and cancer diseases). The responsibilities of the dietitian, studying the patient charts, documentation in the medical record, and patient interviewing. Food-drug interactions are discussed.

		<b>3 CH</b>	Prereq:	0303331
<b>0303452</b>	<b>Nutrition for People of Special Demands</b>	<b>3</b>	<b>0</b>	

This course introduces nutritional care for people who suffer from problems concerning food consumption and metabolism, including hereditary nutritional disorders, chromosomal aberrations, neurologic disorders, and fetal alcohol syndrome, to ensure that they will get their requirements from different nutrients. Disabilities focused on include autism, cerebral palsy, attention- deficit/ hyperactivity disorder, Down syndrome and others.

		<b>3 CH</b>	Prereq:	0303352 0303351+
<b>0303453</b>	<b>Community Nutrition</b>	<b>3</b>	<b>0</b>	

This course analyzes the current nutrition programs and services at the local and national levels. The impact of nutrition policies and legislation on the health of community is discussed. Identifying the nutritional needs of a community and learning how to plan, implement, and evaluate a community nutrition program is outlined. The effect of changing life styles on dietary habits and patterns is explored. Students learn about identifying the food needs and costs in different communities and cultures.

		<b>3 CH</b>	Prereq:	0303331
<b>0303454</b>	<b>Nutrition Throughout the Life Cycle</b>	<b>3</b>	<b>0</b>	

The course explains the health habits and lifestyle practices that must be followed in preconception, pregnancy and lactation period. The course focuses on the nutritional rules and habits that must be met in infants, toddlers, preschoolers, adults and elderly people covering good nutritional habits and practices in different age groups.

<b>3 CH</b>	Prereq:	0303331 0303351+
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<b>0303455</b>	<b>Nutrition Education</b>	<b>3</b>	<b>0</b>
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This course provides the students with the scientific nutritional information and skills needed to make significant differences in the health of their communities and to stress the importance of proper nutrition in disease prevention.

<b>1 CH</b>	Prereq:	Concurrent 0303453
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<b>0303458</b>	<b>Community Nutrition Lab</b>	<b>0</b>	<b>3</b>
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The student practices using nutrition programs and applications. They learn how to communicate with customers and the public in order to implement and evaluate nutritional status. They learn to use different nutrition programs and interview community members and use alternative community resources.

<b>3 CH</b>	Prereq:	Completion of 90 Cr
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<b>0303461</b>	<b>Internship in Food Services</b>	<b>3</b>	<b>0</b>
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This course deals with application of techniques and methods in food services that students have learned, in medical settings such as hospitals and medical centers. The course lasts 16 weeks with an average of 40 hours per week.

<b>3 CH</b>	Prereq:	Completion of 90 Cr
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<b>0303462</b>	<b>Internship in Clinical Nutrition</b>	<b>3</b>	<b>0</b>
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This course deals with determining diet needs for patients using assessment of medical information and planning to prepare special meals. Methods to improve skills which are necessary for team work in clinical nutrition and dietetics are practiced.

<b>3 CH</b>	Prereq:	Completion of 90 Cr
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<b>0303463</b>	<b>Internship in Therapeutic Nutrition</b>	<b>3</b>	<b>0</b>
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This course deals with the application of techniques and methods in therapeutic nutrition that students have learned, in a medical setting such as hospitals and medical centers. The course lasts 16 weeks with an average of 40 hours per week.

<b>3 CH</b>	Prereq:	Completion of 90 Cr
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<b>0303464</b>	<b>Internship in Nutritional Counseling</b>	<b>3</b>	<b>0</b>
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This course deals with the application of techniques and methods in nutritional counseling that students have learned, in a medical setting such as in hospitals and medical centers. The course lasts 16 weeks with an average of 40 hours per week.

<b>0303465</b>	<b>Special Topics</b>	<b>3 CH</b>	Prereq:	Completion of 96 Cr
		<b>3</b>	<b>0</b>	

This course deals with an advanced study in one of the clinical nutrition and dietetics subjects chosen at the beginning of the semester to train students on the proper use of library references. Subjects from the food processing branch related to the chosen subject may be discussed

<b>3 CH</b>	<b>Prereq:</b> 0201101+
	Concurrent
	0304136

<b>0304131</b>	<b>Human Anatomy and Histology</b>	<b>3</b>	<b>0</b>
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The course is intended to cover gross morphology, and microscopic study of all tissue types and organs of the human body such as integumentary, skeletal, muscular, nervous and other systems. Identification of anatomical structures on models will be required in the laboratory. It also covers microscopic organization, study of cells, tissues, the relationship of one structure to another, and how structure and function are interrelated and their clinical applications.

<b>1 CH</b>	<b>Prereq:</b> Concurrent
	0304131

<b>0304136</b>	<b>Human Anatomy and Histology Lab</b>	<b>0</b>	<b>3</b>
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This course is a companion course to the Human Anatomy and Histology theoretical course and is intended to adequately prepare students in health science programs. In the laboratory students will examine microscopic slides to understand the various histological structures of human tissues and organs. It includes the use of anatomical models and preserved animal dissections.

<b>1 CH</b>	<b>Prereq:</b> 0304211
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<b>0304210</b>	<b>Chemistry of Heterocycles</b>	<b>1</b>	<b>0</b>
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This course discusses the structures and the chemistry of the most common heterocyclic compounds. The course starts with nomenclature rules including the common names and some ring systems, followed by the description of saturated and unsaturated heterocyclic compounds properties with emphasis on five-membered and six-membered ring compounds, and the effect of aromaticity on their the chemistry. The course will explain different reactions for the synthesis of both five-membered and six-membered ring heterocyclic compounds, In addition to a brief glance at the important three- and four-membered heterocyclic compounds including some natural and medicinal ones.

<b>2 CH</b>	<b>Prereq:</b> 0902111 +
	Concurrent
	0304216

<b>0304211</b>	<b>Pharmaceutical Organic Chemistry</b>	<b>2</b>	<b>0</b>
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This course is a continuation of the organic chemistry course that provides a comprehensive understanding of significant organic functional groups and their related reaction mechanisms. The course will include: alkadienes and allylic systems, organometallic compounds, alcohols, ethers, carbonyl containing compounds, phenols, enols and synthesis of some pharmaceutically important compounds.

<b>2 CH</b>	<b>Prereq:</b> 0304211 + Concurrent 0304217
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<b>0304212</b>	<b>Pharmacognosy and Phytochemistry</b>	<b>2</b>	<b>0</b>
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This course will provide students with the fundamental principles of pharmacognosy and phytochemistry, including drugs from natural sources and medicinal plants with their taxonomy, constituents and medical uses. The course will also discuss the methods of isolation, active compounds characterization and their biological activities. The course will include: the study of organized and non-organized drugs, secondary metabolites with chemical groups such as anthraquinones, terpenes glycosides, alkaloids, volatile oils and others.

<b>3 CH</b>	<b>Prereq:</b> 0902101+ Concurrent 0304218
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<b>0304213</b>	<b>Analytical Chemistry</b>	<b>3</b>	<b>0</b>
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This course deals with the conventional methods of analysis that are applied to pharmaceutical products covering theory, chemical principles and calculations. In addition, this course familiarizes students with pharmacopoeias and the official methods required for pharmaceutical analysis.

<b>2 CH</b>	<b>Prereq:</b> 0904103
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<b>0304214</b>	<b>Physical Pharmacy</b>	<b>2</b>	<b>0</b>
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Physical Pharmacy is a core-course that covers the basic physicochemical principles of active pharmaceutical ingredients. These physicochemical principles will serve as the bases for the fundamentals of drug formulation and conventional and non-conventional dosage forms. The course will cover the basic principles such as states of matter, mixtures and phase equilibrium, solubility, solubilization, and dissolution, drug stability-degradation and rates of degradation and determination of shelf-life, drug diffusion phenomenon.

<b>2 CH</b>	<b>Prereq:</b> 0301232
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<b>0304215</b>	<b>Clinical Biochemistry</b>	<b>2</b>	<b>0</b>
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The course discusses the biochemistry of disorders arising from acid/base imbalance and the abnormal metabolism of carbohydrates, lipids, proteins, amino acids, nucleic acids, and bile pigments. It also discusses the role of enzyme performance in prognosis of biochemical dysfunctions and the meaning and interpretation of clinical laboratory findings. The course includes theoretical aspects of clinical chemistry, chemical and biochemical reactions, and pathophysiologic relationships.

		<b>1 CH</b>	Prereq:	Concurrent 0304211
<b>0304216</b>	<b>Pharmaceutical Organic Chemistry Laboratory</b>	<b>0</b>	<b>3</b>	

This practical course is the complementary part to the theoretical Pharmaceutical Organic Chemistry course that familiarizes students with the commonly used techniques for organic compounds, functional groups identification, purification and separation. The practical course includes experimental methods for different classes of organic compounds, preparations, important chemical reactions, drugs synthesis and reaction mechanisms.

		<b>1 CH</b>	Prereq:	Concurrent 0304212
<b>0304217</b>	<b>Pharmacognosy and Phytochemistry Lab</b>	<b>0</b>	<b>3</b>	

This practical course is the complementary part to the theoretical Pharmacognosy and Phytochemistry course. This practical course will train students in the most important experimental methods to identify and examine medicinal plants macroscopically and microscopically. The course includes extraction, isolation, identification and characterization of natural products present in medicinal plants such as: anthraquinone, saponin, anthocyanins, terpenes, alkaloids and cardiac glycosides.

		<b>1 CH</b>	Prereq:	Concurrent 0304213
<b>0304218</b>	<b>Analytical Chemistry Lab</b>	<b>0</b>	<b>3</b>	

This course accompanies the theoretical course to train students on qualitative and quantitative methods of analysis, including different types of titrimetric analysis and their applications for analysis of pharmaceutical preparations.

		<b>2 CH</b>	Prereq:	0304211
<b>0304311</b>	<b>Medicinal Chemistry 1</b>	<b>2</b>	<b>0</b>	

This course provides students with an introduction to the molecular bases of drugs action. It provides the knowledge of the relationship between pharmaceutical compounds and their physicochemical properties (relation to absorption, distribution, and elimination). It focuses on the basic knowledge of drug-receptor interaction, types of chemical bonds involved in drug-receptor interactions, drug mechanism of action, and drug metabolism. Also, this course emphasizes the stereochemistry (optical, geometrical, and conformational isomerism) of different pharmaceutical compounds in relation to their pharmacological activity. Finally, this course provides the basic concepts of the prodrug action and drug discovery

2 CH	Prereq	0304311 + Concurrent 0304317
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<b>0304312</b>	<b>Medicinal Chemistry 2</b>	<b>2</b>	<b>0</b>
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This course is based on the concepts of medicinal chemistry that have been taught in Medicinal Chemistry 1. This course deals with the classification of drugs based on their drug-target and their chemical structure. Medicinal Chemistry 2 focuses on the relationship between the structure of drugs and their pharmacological activity (SAR). It also discusses drug mechanisms of action and synthesis. This course includes cholinergic system drugs, adrenergic system drugs, serotonin receptor drugs, local and general anesthetics, antidepressants and Parkinson drugs.

2 CH	Prereq	0304213 + Concurrent 0304318
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<b>0304313</b>	<b>Pharmaceutical Instrumental Analysis</b>	<b>2</b>	<b>0</b>
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This course introduces the student to different types of instrumental analysis and spectral methods of analysis like chromatographic separation techniques. The course includes UV-visible, infra-red (IR), nuclear magnetic resonance (NMR), and mass spectroscopy (MS).

1 CH	Prereq	Concurrent 0304312
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<b>0304317</b>	<b>Medicinal Chemistry 2 Lab</b>	<b>0</b>	<b>3</b>
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This experimental course provides students with skills needed to analyze and synthesize different drugs. Also, it provides the practical practice of the basic concepts of medicinal chemistry, such as partition coefficient. This wet laboratory course provides a variety of methods to perform pharmaceutical synthesis, purification and analysis.

1 CH	Prereq	Concurrent 0304313
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<b>0304318</b>	<b>Pharmaceutical Instrumental Analysis Lab</b>	<b>0</b>	<b>3</b>
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This laboratory teaches students the major methods of instrumental analysis. These methods are used in the laboratory along with other analytical methods in applications for analysis of pharmaceutical preparations. The course includes the spectral methods of analysis including UV-visible, infra-red (IR), and chromatographic separation, nuclear magnetic resonance (NMR), and mass spectroscopy (MS) techniques.

3 CH	Prereq	0304214 + Concurrent 0304326
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<b>0304321</b>	<b>Pharmaceutics (1)</b>	<b>3</b>	<b>0</b>
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This course describes the pharmaceutical dosage forms considering their physical-chemical characteristics. The student will gain knowledge on how to define, formulate, package and label

different pharmaceutical dosage forms. The course includes pharmaceutical calculations, oral solutions, suspensions, emulsions, semi-solids, and aerosols.

		<b>2 CH</b>	Prereq	0304321 + Concurrent 0304327
<b>0304322</b>	<b>Pharmaceutics (2)</b>	<b>2</b>	<b>0</b>	

This course is a continuation of the Pharmaceutics 1 course that describes the pharmaceutical dosage forms considering their physical-chemical characteristics. The student will gain knowledge on how to define, formulate, package and label different pharmaceutical dosage forms. The course includes parenteral, ophthalmic, nasal, otic, transdermal, and rectal route preparations.

		<b>1 CH</b>	Prereq	Concurrent 0304321
<b>0304326</b>	<b>Pharmaceutics (1) Lab</b>	<b>0</b>	<b>3</b>	

This laboratory allows students to practice what they have learned in the theoretical part of the Pharmaceutics 1 course. Students will learn how to prepare, evaluate and dispense pharmaceutical dosage forms. The course includes syrups, colloidal systems, inhalants, pastes, and emulsions.

		<b>1 CH</b>	Prereq	Concurrent 0304322
<b>0304327</b>	<b>Pharmaceutics (2) Lab</b>	<b>0</b>	<b>3</b>	

This lab is a continuation of the Pharmaceutics 1 lab that allows students to practice what they have learned in the theoretical part of Pharmaceutics 2 course. Students will learn how to prepare, evaluate and dispense pharmaceutical dosage forms. The course includes cosmetic preparations, hair gel, shampoo, acne preparations, lotions, and suppositories.

		<b>3 CH</b>	Prereq	Concurrent 0301213
<b>0304331</b>	<b>Pharmacology (1)</b>	<b>3</b>	<b>0</b>	

This course introduces students to fundamentals of pharmacology. It deals with basic pharmacokinetic and pharmacodynamics principles including the receptor theory. The course includes pharmacology of drugs acting on the central nervous system (CNS), the autonomic nervous system (ANS) and drugs affecting CNS disorders.

		<b>3 CH</b>	Prereq	0304331 + Concurrent 0304337
<b>0304332</b>	<b>Pharmacology (2)</b>	<b>3</b>	<b>0</b>	

This course is a continuation of the Pharmacology 1 course. This course will include an introduction to the pharmacology of the cardiovascular system. In addition, detailed mechanisms of action of different drug classes and their uses will be covered. This course will include:

pharmacology of hypertension, angina, heart failure, diabetes, hyperlipidemia, hormones and respiratory system.

		<b>1 CH</b>	Prereq:	Concurrent 0304332
<b>0304337</b>	<b>Pharmacology (2) Lab</b>	<b>0</b>	<b>3</b>	

This lab is the complementary part of the Pharmacology (2) course. It is an observational lab in which students observe drug effects on experimental mice. Students are trained to handle, calculate drug doses and inject drugs to mice. Result recordings, interpretation and discussions are carried out in groups and as individual work as well. This course includes topics such as pain management, anti-inflammatory, sedative and diabetes drugs.

		<b>2 CH</b>	Prereq:	0304212
<b>0304341</b>	<b>Phytotherapy and Homoeopathic Remedies</b>	<b>2</b>	<b>0</b>	

This course is a continuation of the Pharmacognosy and Phytochemistry course. It introduces students to selected classes of natural substances from plants and marine sources. The course involves their therapeutic applications, definitions and phytotherapeutic and homoeopathic terminologies. The course includes the most common international and locally registered plant medications, medical uses and pharmacological effect, preparation methods and duration of use, drug interactions, and adverse effects

		<b>2 CH</b>	Prereq:	0304312 + Concurrent 0304416
<b>0304411</b>	<b>Medicinal Chemistry 3 / Chemotherapy</b>	<b>2</b>	<b>0</b>	

The course is a continuation of the Medicinal Chemistry 2 course with emphasis on a drug-oriented approach to chemotherapeutic agents. This course introduces a study of how basic biological mechanisms have aided in the design and use of different chemotherapeutic agents. The chemistry and biochemical pharmacology of the various classes of agents are considered in detail. The course includes antiparasitic agents, antifungal agents, antibiotics, antimycobacterial agents, antiviral and anticancer drugs.

		<b>1 CH</b>	Prereq:	Concurrent 0304411
<b>0304416</b>	<b>Medicinal Chemistry (3) Lab</b>	<b>0</b>	<b>3</b>	

This course is designed to incorporate a number of experiments for synthesis and analysis of certain drugs which are included in the theoretical course of Pharmaceutical Medicinal Chemistry. This laboratory introduces various quality control methodologies that are considered standards in pharmaceutical literature.

<b>2 CH</b>	Prereq:	0304322 + Concurrent 0304426
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<b>0304421</b>	<b>Pharmaceutical Technology (1)</b>	<b>2</b>	<b>0</b>
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The module is a major requirement that is designed to provide the students with the unit processes taking place in an industrial pharmacy. At this level, the student has been exposed to Pharmaceutics (2), moreover; different basic industrial topics will be illustrated in this module plus different formulation techniques. This module has a reflective, interactive and analytic contextual focus. However, it deals with different problems in formulation and how to deal with such problems.

<b>2 CH</b>	Prereq:	0304332
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<b>0304422</b>	<b>Biopharmaceutics</b>	<b>2</b>	<b>0</b>
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This is an applied course for the dosage forms and their preparation methods that were covered in the previous Pharmaceutics courses (Physical Pharmacy, Pharmaceutics (1), Pharmaceutics (2), Pharmaceutics (1) lab, Pharmaceutics (2) lab, Pharmaceutical Technology (1), Pharmaceutical Technology (2), Pharmaceutical Technology (1) lab, Pharmaceutical Technology (2) lab). Students will learn the interrelationship between physicochemical principles of active pharmaceutical ingredients, dosage form, and route of administration and their effect on the bioavailability of the active pharmaceutical ingredient. This course includes the effect of excipients and manufacturing processes on drug-release and behavior inside the gastrointestinal track. In addition, physiological, pathological, and clinical factors that affect bioavailability of the drug will be covered.

<b>2 CH</b>	Prereq:	0304421 + Concurrent 0304428
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<b>0304423</b>	<b>Pharmaceutical Technology (2)</b>	<b>2</b>	<b>0</b>
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After completion of Pharmaceutical Technology (1) and its fundamentals, this major requirement module which has a reflective, interactive and analytical contextual focus, will provide a comprehensive and sound understanding of the theory and practice of pharmaceutical technology and to appreciate the various processes; batch or continuous, that are available. The importance of the technology process in producing good quality products will be emphasized. Modern techniques of production will be covered. A pragmatic approach will be adopted throughout. The course will examine current compression theory and practice in details.

<b>1 CH</b>	Prereq:	0304322
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<b>0304424</b>	<b>Ethics and Pharmacy Practice</b>	<b>1</b>	<b>0</b>
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This course involves the morals of pharmacy career. Students will learn the fundamentals of pharmacy management and how to interconnect with patients and other colleagues in the medical care team. The course includes Jordanian laws that rule the practice of the pharmacy profession and the registration of drugs.

2	CH	Prereq:	0304341
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<b>0304425</b>	<b>Cosmetic preparations</b>	<b>2</b>	<b>0</b>
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This course is an applied course for the topical dosage forms covered in previous pharmaceuticals courses. Students will be taught the techniques and processes used in the manufacturing of cosmetic preparations. The course will include the skin, topical administration and other related cosmetic uses.

1	CH	Prereq:	Concurrent 0304421
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<b>0304426</b>	<b>Pharmaceutical Technology (1) Lab</b>	<b>0</b>	<b>3</b>
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This course is a complementary part to the theoretical lectures provided by the co-requisite course Pharmaceutical Technology (1). This course is designed to give the student a detailed knowledge concerning powders used in pharmaceutical formulations including: powder mixing, milling, characterization of flowability, compressibility and particle size analysis. The second part of this course is concerned with granulation of powders as one of the main prerequisite steps for tablet compression.

1	CH	Prereq:	Concurrent 0304423
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<b>0304428</b>	<b>Pharmaceutical Technology (2) Lab</b>	<b>0</b>	<b>3</b>
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This course is a complementary part to the theoretical lectures provided by the co-requisite course Pharmaceutical Technology (2). This course is concerned with mainly two unit dosage forms; capsules and tablets. The student practices the formulation of tablets which are then subjected to different aspects of tablet quality control tests. Tablet treatment such as sugar coating process in which the steps of this process and problems encountered during it are dealt with. The capsule section deals with the process of capsule filling and capsule quality control.

3	CH	Prereq:	0304332
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<b>0304431</b>	<b>Pharmacology (3)</b>	<b>3</b>	<b>0</b>
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This course is a continuation of the Pharmacology 1 & 2 courses. In this course, the student will be familiar with different types of chemotherapeutic classes, mechanisms, indications and potential side effects. The concept of drug selectivity will be highlighted. This course includes the pharmacology of chemotherapeutic agents including antibacterial, antifungal, antiviral, antiparasitics and anticancer agents.

			<b>2 CH</b>	Prereq:	0304231 + Concurrent 0304437
<b>0304432</b>	<b>Pharmaceutical Microbiology and Biotechnology</b>	<b>2</b>	<b>0</b>		

This course will introduce students to the infectious microorganism, the biotechnologically produced drugs, recombinant DNA technology and their role in the development of relevant pharmaceutical products. This course includes bacteriology, mycology and virology in terms of their characterization, morphology, virulence factors, role of toxins and enzymes, pathogenesis, diseases, resistance, diagnosis tests, epidemiology, prophylaxis, and treatments. Methods of producing antibiotics using biotechnological techniques will also be covered.

			<b>2 CH</b>	Prereq:	0304431 + Concurrent 0304438
<b>0304433</b>	<b>Therapeutics (1)</b>	<b>2</b>	<b>0</b>		

This course introduces senior students to the use of medications in different clinical situations. Detailed drug dosing, drug interactions and medication optimization according to patient profiles will be discussed for different systemic diseases. The course includes medications used for neurological and psychiatric disorders, infectious diseases, immunological and hematological diseases.

			<b>2 CH</b>	Prereq:	0304432
<b>0304434</b>	<b>Immunology and Vaccines</b>	<b>2</b>	<b>0</b>		

This course introduces students to the functions of the immune system and its involvement in disease states. It also emphasizes on the role of vaccines as therapeutic options in prophylaxis of many serious diseases. Autoimmune diseases and their therapies will be discussed. The course includes antigenic specificity, chemistry of antibodies and their interactions with antigens and cells.

			<b>3 CH</b>	Prereq:	Completion of 99 credit hrs
<b>0304435</b>	<b>Community Pharmacy</b>	<b>3</b>	<b>0</b>		

In this course students are trained for 8 consecutive weeks in a registered community pharmacy inside Jordan. Students are not allowed to train outside Jordan. Students are not allowed, under any circumstances, to register for courses along with the training.

			<b>1 CH</b>	Prereq:	Concurrent 0304432
<b>0304437</b>	<b>Pharmaceutical Microbiology and Biotechnology Lab</b>	<b>0</b>	<b>3</b>		

This practical course is the complementary part to the theoretical Pharmaceutical Microbiology and Biotechnology course. Students in this lab will gain skills in different methods of culturing, staining and identifying bacteria. The course includes sterilization techniques, and other methods regarding the identification and isolation of microorganisms.

		<b>1 CH</b>	Prereq	Concurrent 0304433
<b>0304438</b>	<b>Therapeutics (1) Lab</b>	<b>0</b>	<b>3</b>	

This lab is the complementary part of the Therapeutics (1) course. This course provides students with practical clinical skills to aid patients receiving effective and safe medications. Clinical cases regarding pediatric dosing calculation and appropriate dosage form selection for a variety of childhood illnesses.

		<b>3 CH</b>	Prereq:	0304341
<b>0304511</b>	<b>Toxic Plants</b>	<b>3</b>	<b>0</b>	

The course discusses the role of toxic plants in medicine development, toxic effects, poisonous symptoms, and the available antidotes for each class. The course includes toxic plant identification and characterization, taxonomy, active secondary metabolites, their uses in folk medicine, advanced research regarding each toxic plant, poisonous symptoms with relevant treatment.

		<b>3 CH</b>	Prereq:	0304411
<b>0304512</b>	<b>Drug Design</b>	<b>3</b>	<b>0</b>	

This course covers essential principles of drug design and synthesis. The course includes studying methods of high-throughput synthesis and computer modeling and the biochemical basis for novel mechanisms of drug action. The course includes lead identification, lead optimization, classification and kinetics of molecules, targeting enzymes and receptors, pro-drug design and applications.

		<b>3 CH</b>	Prereq	0304422 + Concurrent 0304526
<b>0304521</b>	<b>Pharmacokinetics</b>	<b>3</b>	<b>0</b>	

This is a core-course in the field of pharmacokinetics. Students will learn the basic principles including the terminology, calculations of the drug's half-life, plasma concentration, urinary concentration, dosage regimen design, dosage adjustment after a single and multiple administration through various routes including intravenous and oral. This course includes the absorption of drugs after oral administration in detail, further, all calculations will be based on compartmental linear first order kinetics; and the concepts of non-linear and non-compartmental pharmacokinetics.

<b>0304522</b>	<b>Advanced Pharmaceutical Technology</b>	<b>3 CH</b>	<b>3</b>	<b>0</b>	Prereq: 0304423
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This course educates students about the latest developments in pharmaceutical technologies and equipment used in drug manufacturing. The course includes nanotechnology, advanced tablet coating techniques and advanced microencapsulation.

<b>0304526</b>	<b>Pharmacokinetics Lab</b>	<b>1 CH</b>	<b>0</b>	<b>3</b>	Prereq: Concurrent 0304521
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This course is an application (dry lab/workshop) for the concurrent course Pharmacokinetics, in which students will have applied clinical and non-clinical cases of the topics covered in the Pharmacokinetics course. This includes dosage regimen design and adjustment, calculation of plasma concentration and half-life of the drug, urinary excretion, and steady-state concentration. This course includes calculations and case studies based on known-basic graphical methods that will be covered in detail in the Pharmacokinetics course.

<b>0304531</b>	<b>Therapeutics (2)</b>	<b>2 CH</b>	<b>2</b>	<b>0</b>	Prereq: 0304433 + Concurrent 0304536
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This course is a continuation of the Therapeutics (1) course. This course introduces students to clinical skills for chronic diseases. Students will be familiar with drug selection basis, dose titration, patient counseling and education for achieving therapeutic endpoints. The course includes the cardiovascular and endocrine systems.

<b>0304532</b>	<b>Clinical Nutrition</b>	<b>2 CH</b>	<b>2</b>	<b>0</b>	Prereq: 0304215
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This course is designed to introduce students to the effect of food on health. It will also discuss the importance of supplying patients with the required types and portions of certain food components to prevent and alleviate certain diseases. The course includes obesity and its relation with physical exercise, home parenteral nutrition, food-induced allergy, and special nutrition for disease states.

<b>0304533</b>	<b>Patient Counseling</b>	<b>2 CH</b>	<b>2</b>	<b>0</b>	Prereq: 0304531
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This course focuses on essential skills required to provide advice and guidance to patients concerning the treatment plan. This course provides the student with the basic information needed to help the patient treat frequently occurring health problems whether acute or chronic. The course implements knowledge acquired in Pharmacology and Homeopathy courses. The course includes basic information needed to help patients treat frequently occurring health problems such as cold, constipation and diarrhea.

<b>0304534</b>	<b>Advanced Pharmaceutical Biotechnology</b>	<b>3 CH</b>	Prereq: 0304432
		<b>3</b>	<b>0</b>

Students in this course will be taught modern pharmaceutical biotechnological methods. These methods will include the production and purification of proteins involved in pharmaceutical production. The course includes molecular biology, gene synthesis and genetic technology

<b>0304535</b>	<b>Advanced Pharmaceutical Microbiology</b>	<b>3 CH</b>	Prereq: 0304434
		<b>3</b>	<b>0</b>

This course covers the properties of pathogens (bacteria and fungi) in their single (planktonic) and aggregate (biofilm) forms, the effect of antibiotics on both forms, comparison of antibiotic resistance in both cases and determination of best methods for eradication. The course includes the methods of separation, analysis and characterization of the microbiological products.

<b>0304536</b>	<b>Therapeutics (2) Lab</b>	<b>1 CH</b>	Prereq: Concurrent 0304531
		<b>0</b>	<b>3</b>

This lab is the complementary part of the Therapeutics (2) course. It introduces students to selected clinical cases. Students acquire clinical skills in treating clinical cases. Topics covered include: pain management, gastrointestinal system and infectious diseases.

<b>0304537</b>	<b>Advanced Therapeutics</b>	<b>3 CH</b>	Prereq: 0304531
		<b>3</b>	<b>0</b>

This course discusses the therapeutics for some clinical cases and selected drugs in a comprehensive and detailed manner. The course includes advanced topics in certain disorders such as cardiovascular system disorders and metabolic disorders (diabetes mellitus).

<b>0304538</b>	<b>Communication Skills in Pharmacy</b>	<b>3 CH</b>	Prereq: 0304543
		<b>3</b>	<b>0</b>

This course discusses proper communication skills in the pharmaceutical environment. The course also discusses the specific requirements for communicating with the elderly and patients with special needs to provide distinguished and specialized pharmaceutical services. The course includes communication skills used in education, development of creative services, supervision, resolving conflicts and dealing with different groups of the society.

<b>0304541</b>	<b>Drug Delivery Systems</b>	<b>3 CH</b>	Prereq: 0304423
		<b>3</b>	<b>0</b>

In this course, students will extend the previous knowledge they gained in the Pharmaceutics courses to more modern and novel drug delivery systems for various treatment and diagnostic applications. The course includes extended-release drug delivery systems, nanomedicines, Hot melt extruded solid dosage forms, and patch transdermals.

<b>0304542</b>	<b>Protein and Gene Therapy</b>	<b>2 CH</b>	Prereq: 0304434
		<b>2</b>	<b>0</b>

In this course students are introduced to biotechnological techniques in the pharmaceutical field. The course will present the huge future potential of this field beyond conventional treatment strategies. Topics covered are hereditary and rare diseases. The course includes the chemical, pharmaceutical and therapeutic aspects of protein and gene medications.

<b>0304543</b>	<b>Marketing and Pharmacoeconomics</b>	<b>3 CH</b>	Prereq: 0304424
		<b>3</b>	<b>0</b>

This course introduces students to the fundamentals of pharmacoeconomics, marketing and cost-effectiveness investigation. The course includes pharmaceutical marketing environments, patient and selection of treatment agent, pharmaceutical marketing, and compliance enhancement.

<b>0304544</b>	<b>Pharmacogenetics</b>	<b>2 CH</b>	Prereq: 0304434
		<b>2</b>	<b>0</b>

This course introduces students to the relationship between genetic polymorphisms and response to drugs. Pharmacogenetic importance in chronic disease medications will be highlighted, dose tailoring will be discussed to maximize therapeutic benefits while minimizing side effects and costs. Pharmacogenetics of CNS medications and cardiovascular drugs will be discussed.

<b>0304545</b>	<b>Drug Registration and Approval</b>	<b>3 CH</b>	Prereq: 0304422
		<b>3</b>	<b>0</b>

This course discusses methods of drug approval and registration. The course covers the phases of drug studies on animals and other clinical studies required. The course includes clinical phases, animal studies and FDA regulations.

<b>0304550</b>	<b>Selected Topics (1)</b>	<b>1 CH</b>	Prereq: Department approval
		<b>1</b>	<b>0</b>

A selected topic in pharmaceutical sciences will be assigned to students to fulfill certain academic requirements.

<b>0304551</b>	<b>Selected Topics (2)</b>	<b>2CH</b>	Prereq: Department approval
		<b>2</b>	<b>0</b>

A selected topic in pharmaceutical sciences will be assigned to students to fulfill certain academic requirements.