Form: Study Plan- Bachelors	Form Number	EXC-01-03-02A
	Issue Number and Date	2963/2022/24/3/2 5/12/2022
	Number and Date of Revision or Modification	2/ (10/12/2023)
	Deans Council Approval Decision Number	50/2023
	The Date of the Deans Council Approval Decision	26/12/2023
	Number of Pages	

.1	School	Agriculture
.2	Department	Nutrition and Food Technology
3.	Program title (Arabic)	البكالوريوس في علم وتكنولوجيا الغذاء
4.	Program title (English)	B.Sc. Degree in Food Science and Technology

5. Components of Curriculum:

The curriculum for the bachelor's degree in **Food Science and Technology** consists of (**138**) credit hours distributed as follows

Number	Type of requirement	credit hours
First	University Requirements	27
Second	Faculty Requirements	24
Third	Department Requirements	87
Total		**138**

6. Numbering System:

A- Department number

Number	Department
1	Horticulture and Crop Science
2	Animal Production
3	Nutrition and Food Technology
4	Land, Water and Environment
5	Agricultural Economics and Agribusiness Management
6	Plant Protection

B- Course number

Domain number	Domain title	Domain number	Domain title
0	General	5	Hygiene and diet therapy
1	Basic sciences	6	Population and environment
2	Foods	7	Nutrition counselling and education
3	Human nutrition	8	Laboratory methods
4	Food processing	9	Training, Research and Seminars

C- Course number consists of 7 digits.

Faculty		Department		Level	Sequence	(Field)
0	6	0	3	1	0	1

First: University Requirements (27) credit hrs.:

All students admitted to the university must apply for a degree examination in Arabic and English and the computer is prepared or approved by the university to determine their level. Based on the results of the examinations, either the student will study one or more of the requirements of the preparatory program.

Main Group: General Requirements Hours: 15

Course number	Course name	Hours	Prerequisite Course	Parallel Requirements
0600150	Community service	0		
1902098	Computer skills placement test	0		
1932099	Basics of computing	3		
3201001		3		
3201002		3	3201001	
3202001	English language (Level 1)	3		
3202002	English language (Level 2)	3	3202001	
3211098	Arabic placement test	0		
3212098	English placement test	0		

Main Group: Obligatory University Requirements Hours:18

Course number	Course Name	Hours	Pre_ Request Course	
2220100	MILITARYSCIENCES	3.0		
3202003	ENGLISH LANGUAGE (LEVEL ٣)	3.0	3202002	
3400100	NATIONALCULTURE	3.0		
3420100				
3420101				
3420103			3202003	

Main Group: Elective University Requirements Hours: 9

Subgroup: Min Limit 3 MaxLimit:3

Course number	Course Name	Hours	Pre_ Request Course	Parallel Requirements
0310102	ENVIRONMENTAL CULTURE AND DEVELOPMENT	3.0		
0400102	ISLAMIC CULTURE	3.0		
0720100	HEALTH CULTURE	3.0		
1000102	LEGAL CULTURE	3.0		
1100100	PHYSICAL FITNESS CULTURE	3.0		
3400103	INTRODUCTION TO PHILOSOPHY AND CRITICAL THINKING	3.0		
3400111		3.0		

Subgroup: Min Limit 3 MaxLimit:3

Course number	Course Name	Hours	Pre_ Request Course	Parallel Requirements
0400101	ISLAM AND CONTEMPORARY ISSUES	3.0		
1900101	SOCIAL MEDIA	3.0		
2000100	APPRECIATION OF ARTS	3.0		

2200103	FOREIGN LANGUAGE	3.0		
2300101	ARAB- ISLAMIC CIVILIZATION	3.0		
2300102	JORDAN: HISTORY AND CIVILIZATION	3.0		
3400106	SPECIAL SUBJECT	3.0		
3400107	GREATBOOKS	3.0		
3400108	JERUSALEM	3.0		

Subgroup: Min Limit 3 MaxLimit:3

Course number	Course Name	Hours	Pre_ Request Course	Parallel Requirementas
1900104		3.0	1900103	

Second: School courses: distributed as follows:

A. Obligatory school courses: (24) credit hours

B. Elective school courses: None

A. Obligatory school courses: (24) credit hours:

Course Number	Course Name	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
0301101	Calculus (1)	3	-	3	-
0333106	General Chemistry for Life Sciences	3	-	3	-
0333109	Experimental General Chemistry for non-Chemistry Students	-	3	1	0333106 or Sim.
0334103	Biology for life Sciences	3	-	3	-
0304111	Practical General Biology (1)	-	3	1	0334103 or Sim.
0342103	General Physics for Life Sciences	3	-	3	-
0332113	Experimental General Physics for life Sciences	-	3	1	0342103 or Sim.
0661101	Principles of Plant Production	3	-	3	0334103
0605151	Biostatistics and Data Analysis	3	-	3	1900103
1900103	Modern Digital Skills	3	-	3	1932099

B. Elective school courses: None

Third: Specialty courses: (87) credit hours distributed as follows:

A. Obligatory specialty courses: (75) credit hours

B. Elective specialty courses: (12) credit hours

A. Obligatory specialty courses: (75) credit hours:

Course Number	Course Name	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
0333211	Analytical Chemistry	3	-	3	0333106

Course Number	Course Name	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
0303216	Experimental Analytical Chemistry	-	3	1	0333211 +333109
0333233	Organic Chemistry for non-Chemistry Majors	3	-	3	0333106
0303239	Practical Organic Chemistry for non-Chemistry Majors	-	3	1	0333233 or Sim.
0602301	General Biochemistry	3	-	3	0333233
0633220	Principles of Food Science	2	-	2	0334103 + 0333106
0603231	Fundamentals of Nutrition	3	-	3	0334103 + 0333106
0603303	General Microbiology	2	2	3	0304111
0603321	Food Chemistry	3	-	3	0333233
0603305	Food Analysis Methods	2	3	3	0303239
0613340	Fundamentals of Food Engineering	2	2	3	342103+ 301101
0613341	Food Preservation and Processing	2	2	3	0633220
0633342	Food Packaging	2	-	2	0333106 or 0633220
0603401	Food Microbiology	2	2	3	0603303
0643410	Sensory Evaluation of Foods	2	2	3	0633220 or 605151
0603420	Food Additives	2	-	2	0333106
0643441	Dairy Science and Technology	2	3	3	0613341
0613444	Food Biotechnology	2	3	3	0603303
0633447	Food Quality Control	2	-	2	0613341
0643453	Food Hygiene	3	-	3	0603401
0603464	Total Quality Management Systems	3	-	3	Fourth grade level
0603462	Food Control and Legislation	2	-	2	0643453

Course Number	Course Name	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
0653497	Scientific Readings and Research Methods in Food Science and Technology	3	-	3	(*)
Employability Readiness					
0662490	Fundamentals of Employment Readiness (Interpersonal skills and professional Development-General)	-	6	3	(*)
0653496	Employment Readiness: Specialized Skills in Food Science and Technology	-	6	3	(*)
Practical Training					
0613496	Training in Food Inspection Institutions	-	8	3	(**)
0613497	Training in Food Processing	-	8	3	(**)
0613499	Training and Graduation Project in Food Science and Technology	-	8	3	(**)

(*) Minimum completion of 89 credit hours successfully, in addition to the department approval.

(**) Completion of (110 credit hours successfully) and passing the following courses: Food Analysis Methods, Food Preservation and Processing, Food Hygiene, Sensory Evaluation of Foods and Total Quality Management System, in addition to the department approval.

B. Elective specialty courses: (12) credit hours:

Course Number	*Course Name*	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
First Group	Food Science and Technology	The student chooses 6 credit hours from the following courses			
0633346	Processing of Traditional Foods	2	2	3	0613341

0613437	Confectionary Production	2	2	3	0613341
0613442	Processing of Juices and non-Alcoholic Beverages	2	2	3	0633220
0633443	Meat Science and Technology	2	2	3	0613341
0643444	Cereal Chemistry and Processing	2	2	3	0613341
0613438	Fats and Oils Chemistry	2	2	3	0603321
0633448	Fruits and Vegetables Processing	2	2	3	0613341
Second Group	**Human Nutrition and Dietetics**	**The student chooses 3 credit hours from the following courses**			
0643332	Human Nutrition and Metabolism	3	-	3	0602301
0613361	Management of Food Services Institutes	3	-	3	0643453
0603353	Introduction to Dietetics	3	-	3	0603231
0603333	Nutrition and Genes	3	-	3	0334103 or 0603231
0603438	Functional Foods	3	-	3	0603231
0645441	Food Security	3	-	3	-
Third Group	**Agricultural Sciences**	**The student chooses 3 credit hours from the following courses**			
0602101	Principles of Animal Production	3	-	3	0334103
0605101	Principles of Agricultural Economics	3	-	3	0301101
0635230	Agribusiness Marketing	3	-	3	-
0606351	Pesticides	2	2	3	0333106
0604334	Green Skills and Sustainability	3	-	3	-
0605322	Innovation and Entrepreneurship for Agribusiness	3	-	3	-

Fourth: Courses offered by other faculties and departments

Course Number	Course Name	Contact Hours		Credit Hours	Pre-requisite
		Theory	Practice		
0301101	Calculus (1)	3	-	3	-
0333106	General Chemistry for Life Sciences	3	-	3	-

0333109	Experimental General Chemistry for non-Chemistry Students	-	3	1	0333106 or Sim.
0334103	Biology for life Sciences	3	-	3	-
0304111	Practical General Biology (1)	-	3	1	0334103 or Sim.
0342103	General Physics for Life Sciences	3	-	3	-
0332113	Experimental General Physics for life Sciences	-	3	1	0342103 or Sim.
0661101	Principles of Plant Production	3	-	3	0334103
0605151	Biostatistics and Data Analysis	3	-	3	1900103
1900103	Modern Digital Skills	3	-	3	1932099
0333211	Analytical Chemistry	3	-	3	0333106
0303216	Experimental Analytical Chemistry	-	3	1	+333109 0333211
0333233	Organic Chemistry for non-Chemistry Majors	3	-	3	0333106
0303239	Practical Organic Chemistry for non-Chemistry Majors	-	3	1	0333233 or Sim.
0602301	General Biochemistry	3	-	3	0333233
0662490	Fundamentals of Employment Readiness (Interpersonal skills and professional Development- General)	-	6	3	(*)
0645441	Food Security	3	-	3	-
0602101	Principles of Animal Production	3	-	3	0334103
0605101	Principles of Agricultural Economics	3	-	3	0301101
0635230	Agribusiness Marketing	3		3	-
0606351	Pesticides	2	2	3	0333106
0604334	Green Skills and Sustainability	3	-	3	-
0605322	Innovation and Entrepreneurship for Agribusiness	3	-	3	-

Fifth: Guided Study Plan for Food Science and Technology Program Students

First Year

Fall			Spring		
Course Number	Course Name	Credit Hours	Course Number	Course Name	Credit Hours
0333106	General Chemistry for Life Sciences	3	0301101	Calculus (1)	3
0333109	Experimental General Chemistry for non-Chemistry Students	1	0333233	Organic Chemistry for non-Chemistry Majors	3
0334103	Biology for Life Sciences	3	0303239	Practical Organic Chemistry for non-Chemistry Majors	1
0304111	Practical General Biology (1)	1	1900103	Modern Digital Skills	3
0342103	General Physics for Life Sciences	3	0661101	Principles of Plant Production	3
0332113	Experimental General Physics for life Sciences	1		University requirement	3
	University requirement	3			
Fall Total		**15**	**Spring Total**		**16**
Summer			**University requirement**		**3**
			University requirement		**3**
Summer Total		**6**	**Academic Year Total**		**37**

Second Year

Fall			Spring		
Course Number	Course Name	Credit Hours	Course Number	Course Name	Credit Hours
0603231	Fundamentals of Nutrition	3	0603321	Food Chemistry	3
0633220	Principles of Food Science	2	0602301	General Biochemistry	3
0333211	Analytical Chemistry	3	0603401	Food Microbiology	3
0605151	Biostatistics and Data Analysis	3	0613341	Food Preservation and Processing	3
0603303	General Microbiology	3	0303216	Experimental Analytical Chemistry	1
0603305	Food Analysis Methods	3		University requirement	3
Fall Total		**17**	**Spring Total**		**16**
Summer			**University requirement**		**3**
			University requirement		**3**
Summer Total		**6**	**Academic Year Total**		**39**

Third Year

Fall			Spring		
Course Number	Course Name	Credit Hours	Course Number	Course Name	Credit Hours
0633447	Food Quality Control	3	0643410	Sensory Evaluation of Food	3
0643453	Food Hygiene	3	0643441	Dairy Science and Technology	3
0603420	Food Additives	2	0633342	Food Packaging	2
0613444	Food Biotechnology	3		Elective department requirement	3
0613340	Fundamentals of Food Engineering	3		Elective department requirement	3
	University requirement	2			
Fall Total		**16**	**Spring Total**		**14**

Summer	0662490	Fundamentals of Employment Readiness (Interpersonal skills and professional Development-General)	**3**
	0653496	Employment Readiness: Specialized Skills in Food Science and Technology	**3**
		University requirement	**3**
Summer Total		**9** **Academic Year Total**	**39**

Fourth Year

Fall			**Spring**		
Course Number	**Course Name**	**Credit Hours**	**Course Number**	**Course Name**	**Credit Hours**
0603462	Food Control and Legislation	2	0613496	Training in Food Inspection Institutions	3
0603464	Total Quality Management Systems	3	0613497	Training in Food Processing	3
0653497	Scientific Readings and Research Methods in Food Science and Technology	3	0613499	Training and Graduation Project in Food Science and Technology	3
	Elective department requirement	3			
	Elective department requirement	3			
Fall Total		**14**	**Spring Total**		**9**
Summer			-		-
			-		-
Summer Total		-	**Academic Year Total**		**23**

Sixth: Course Description

Specialty Courses Offered by the Department

(0) General

Course Number: 0603303	Course Name :General Microbiology	Credit Hours : 3
Pre-requisite: - (0304111)		
Description Gain knowledge about the diversity of microorganisms; what they are made of, and how they live and function, evolutionary relationships and taxonomy; microbial cell structure and functions; genetic systems of microorganisms; nutrition, physiology and energy; extrinsic and intrinsic relationship of microorganisms and the environment; control of microorganisms; introduction to immunology, and how they can affect our life and how to deal with the bio risk associated with them. In the practical session, students will gain intensive training on microscopy, staining and culturing techniques; enumeration, isolation and biochemical identification of microorganisms.		
Course Number: 0603401	Course Name :Food Microbiology	Credit Hours: 3
Pre-requisite: - (0603303)		
Description Gain information about the role of microorganisms in foods and its effect on food quality and safety, factors determine persistence of microorganisms in foods. Specificity of microorganisms to selected foods and define specificity factors, reasons that make certain microorganisms cause illnesses threatening our health and others cause food spoilage thus loss of quality and economical losses. The role of other microorganisms in food processing and products development. In practical part, students will learn basic knowledge and skills in definition and quantification microorganisms in foods.		

(1) Basic Sciences

Course Number: 0643410	Course Name :Sensory Evaluation of Foods	Credit Hours : 3
Pre-requisite: - (0605151 or 0633220)		
Description Study if the importance of sensory evaluation of food. The proper conditions that are needed for conducting the sensory evaluation tests. The different methods used in the sensory evaluation. How taste, odor and aroma as well as the additional sensations and threshold tests are evaluated. Understand how sensory evaluation tests are performed on selected local fresh and/or processed foods including some traditional foods. How to apply statistical analysis methods to the results gained.		

(2) Foods

Course Number: 0633220	Course Name: Principles of Food Science	Credit Hours : 2
Pre-requisite: - (0334103 + 0333106)		
Description Study of the main definitions and principles of food science and technology; the composition of foods and their role in food processing; and the influence of processing on food attributes; The causes of food spoilage and explaining the principles of how food is preserved by several methods.		
Course Number: 0603321	Course Name :Food Chemistry	Credit Hours : 3
Pre-requisite: - (0333233)		
Description Studying the major and many of the minor food components; the importance of water and colloids in foods; the major food components; how they are chemically classified, what is their structure, occurrence, properties, and functions. The chemical changes may occur during handling, storage, preservation, and processing. Explaining the minor natural food components such as: enzymes, flavors, colors and a view on food additives.		
Course Number: 0603305	Course Name :Food Analysis Methods	Credit Hours : 3
Pre-requisite: - (0303239)		
Description Learn how the food is chemically analyzed, what are the methods of sampling, recording, and interpreting of results, know the experimental errors; the spectroscopy theory, how to analyze metals using atomic absorption, spectrophotometry. The chromatographic techniques and how paper, thin layer, GLC and HPLC are applied in food analysis.		
Course Number: 0603420	Course Name :Food Additives	Credit Hours: 2
Pre-requisite: - (0333106)		
Description Introducing topics related to the advantages and disadvantages of food additives. What is the basis for their safety? How additives safety is evaluated in relation to the regulatory aspects. Introducing different classes of food additives with respect to chemical and physical nature as well as mode of action. Active learning will be applied by preparing and analyzing research papers and presenting them to an audience.		

(3) Human Nutrition

Course Number: 0603231	Course Name :Fundamentals of Nutrition	Credit Hours: 3
Pre-requisite: - (0334103 + 0333106)		

Description Identifying the basic concepts in nutrition, explaining nutrients and how they are metabolized and the biochemical transformations taking place within the living body, with a focus on comparing the fate of different nutrients and how they are interrelated and integrated into energy metabolism in the body; and recognize pathological problems resulting from malnutrition and its symptoms.		
Course Number: 0643332	**Course Name :Human Nutrition and Metabolism**	**Credit Hours: 3**
Pre-requisite: - (0602301)		
Description Gain insight about the applications of human nutrition concepts explaining the integration of the effect of nutrients and nutritional status of metabolic and physiological function at cellular, tissue, organ, and whole-body level in humans as related to health and disease; emphasizing how metabolic homeostasis is regulated; appreciate various types of health clams and their nutrient implications; recognize dietary standards and what are their methods of a determination under different physiological conditions; focus on how drugs and nutrients have interacted in humans; explain how nutrition can affect human physical fitness.		
Course Number: 0603333	**Course Name: Nutrition and Genes**	**Credit Hours: 3**
Pre-requisite: - (0603231 or 0334103)		
Description In this course, students will acquire fundamental concepts on the importance of nutrition from the molecular to the organismal levels in health and disease. Particularly, how significant nutrients regulate genes and how certain genes regulate the metabolic pathways involved in nutrient homeostasis. Furthermore, students will cultivate awareness and obtain skills necessary to be constantly updated in the fields of nutrigenomics and personalized nutrition by exploring and discussing recent scientific articles on the topic. Experts people will be invited to give students lectures or a variety of interactive activities.		
Course Number: 0603438	**Course Name: Functional Foods**	**Credit Hours: 3**
Pre-requisite: - (0603231)		
Description The student knows the definition of functional foods and learns their uses and components which include prebiotics, probiotics, phytochemicals, herbs, some animal and plant products, some active chemicals such as sterols, polyphenols, and antioxidants. In addition, the student learns the benefits and health claims and risks related to their misuse.		

(4) Food Processing

Course Number: 0613340	**Course Name :Fundamentals of Food Engineering**	**Credit Hours: 3**

Pre-requisite: - (0342103 + 0301101)		
Description Introducing topics related to the fundamentals required for food engineering. Introducing case studies to solve problems in the field of food engineering principles in food processing. How to perform calculations and solve problems related to mass and energy balance, heat and mass transfer (and their combination), flow characteristics of fluids, gas and vapors and drying kinetics and psychrometrics. Active learning will be applied by preparing and analyzing research papers and presenting them to an audience.		
Course Number: 0613341	**Course Name :Food Preservation and Processing**	**Credit Hours: 3**
Pre-requisite: - (0633220)		
Description Introducing the importance and aims of food preservation, causes of food spoilage and methods used in their prevention; food preservation by heat, low temperature, lowering water activity, radiation, chemicals used in food preservation.		
Course Number: 0633342	**Course Name :Food Packaging**	**Credit Hours: 2**
Pre-requisite: - (0333106 or 0633220)		
Description Determining the types of food packaging materials: metals, glass, paper, and plastics; production of food packaging materials, their chemical and physical properties, their interaction with foods. To introduce the methods followed in quality evaluation of packaged foods and their selection; different filling systems and principles of filling techniques used in food industry.		
Course Number: 0633346	**Course Name :Processing of Traditional Foods**	**Credit Hours: 2**
Pre-requisite: - (0613341)		
Description Study of local traditional foods from cereals, legumes, oils seeds, fruits, dairy and meat, in addition to bakery products, desserts and beverages; methods of production, sensory and quality characteristics, specifications, storage, uses and their nutrition and health importance.		
Course Number: 0613437	**Course Name :Confectionary Production**	**Credit Hours: 2**
Pre-requisite: - (0613341)		
Description Study of classification of the different types of candy and chocolate products technologies and ingredients used in their production with respect to their functional roles and their effects on health and specifications.		

The practical part includes production of some selected products in addition to field visits to confectionary factories.		
Course Number: 0643441	**Course Name :Dairy Science and Technology**	**Credit Hours: 3**
Pre-requisite: - (0613341)		
Description Study of milk composition and physical, chemical and sensory properties of milk; micro flora of milk; liquid milk processing; cream and butter production; starter culture technology as well as processing of milk powder, ice cream, evaporated milk, cheese and processed cheese.		
Course Number: 0613442	**Course Name: Processing of Juices and non-Alcoholic Beverages**	**Credit Hours: 3**
Pre-requisite: - (0633220)		
This course aims to provide the student with enough knowledge in the technology and processing of the various types of non-alcoholic beverages, including fruits juices, beverages, bottled water, tea, coffee, cocoa, and chocolate drinks. The course also includes the quality control aspects of these beverages.		
Course Number: 0613444	**Course Name :Food Biotechnology**	**Credit Hours: 2**
Pre-requisite: - (0603303)		
Description In this course, students will get an overview of several current food biotechnological tools, such as recombinant DNA, bioreactors, and Nanobiotechnology. The theoretical part is divided into four main topics: Molecular biotechnology, fermentation and enzymes, plant and animal biotechnology, and Food safety testing and quality monitoring using biotechnology. In the practical part, students will apply the acquired theoretical knowledge by performing or simulating experiments such as food color gel electrophoresis, production of enzymes, vitamins or organic acids using continuous fermentation, and detecting genetically modified food using PCR.		
Course Number: 0633443	**Course Name :Meat Science and Technology**	**Credit Hours: 3**
Pre-requisite: - (0613341)		
Description Structure and composition of different types of meats; methods of slaughtering and carcass preparation; post-mortem changes in meats and factors affecting them; spoilage of meats and methods of prevention; processing methods of different meat products and machinery and equipment used.		
Course Number: 0643444	**Course Name :Cereal Chemistry and Processing**	**Credit Hours: 3**
Pre-requisite: - (0613341)		

Description
Introducing the principal cereal grains and their products, especially wheat with respect to structure, composition and physical and chemical properties and storage conditions; Production of cereal flour, bakery products especially breads, pasta, breakfast cereals, as well as production of starch and gluten; practical exercises on processing and evaluating the quality of the different cereal products.

Course Number: 0613438	Course Name :Fats and Oils Chemistry	Credit Hours: 3
Pre-requisite: - (0603321)		
Description Explaining the sources, composition and properties of edible fats and oils and their effects on the quality of fat - based foods; technologies of fat processing such as extraction, refining, hydrogenation, winterization; production of fat products such as margarine, ghee, salad oil as well as some non-food products based on fat; quality control tests for the various oils and fats.		
Course Number: 0633447	Course Name :Food Quality Control	Credit Hours: 2
Pre-requisite: - (0613341)		
Description Basic concepts of food quality control with respect to its importance as well as the related terms and definitions. Food quality control development, food quality parameters and how they are evaluated. Statistical tools needed in the application of quality management i.e. sampling and charting. Discussing the structure, management and functions of quality control systems on industrial and regulatory scales. The audit process, registration and certification will be also covered. Active learning will be applied by preparing and analyzing research papers and presenting them to an audience.		
Course Number: 0633448	Course Name :Fruit and Vegetable Processing	Credit Hours: 3
Pre-requisite: - (0613341)		
Description Study of vegetables, fruits and their products: their nutritional value and quality, post-harvest physiological relationship to processing, regulation of ripening processes, the effect of physiological, pathological and entomological disorders affecting fruits and vegetables on product quality, methods of harvesting, grading and packaging, different storage methods and their impact on product quality. The practical part includes applications on canning, drying and freezing fruits and vegetables and making juices and jams.		

(5) Hygiene and Diet Therapy

Course Number: 0603353	Course Name :Introduction to Dietetics	Credit Hours: 3

Pre-requisite: - (0603231)		
Description Gain insight into the applications of basic human nutritional principles emphasizing how can utilize them in the selection of normal and therapeutic diets; explain the elements of nutritional care process; focus on the concepts of healthy dietary guides and food exchanges; recognize the criteria of the healthful diet; appreciate the various techniques of clients interviewing and counselling; understand the role of the dietician; acknowledge common hospital therapeutic diets and what are main diseases requiring diet therapy.		
Course Number: 0643453	Course Name :Food Hygiene	Credit Hours : 3
Pre-requisite: - (0603401)		
Description The student learns in this course the concept of food hygiene and its importance. How hazards are associated with food and the epidemiology of foodborne illness. What are the hygienic requirements in food production, harvesting areas and in food establishments. In addition to learning the design and construction requirements for hygienic food handling, processing and storage and how to prevent cross contamination. Understanding personal hygiene and health requirements, cleaning and disinfection and pest control. And how to apply hazard analysis and critical control point (HACCP) system and ISO 22000 in food establishments.		

(6) Population and Environment

Course Number: 0613361	Course Name: Management of Food Services Institutes	Credit Hours: 3
Pre-requisite: - (0643453)		
Description Students will get information about foodservice industry including types of organizations and trends in foodservice. Be familiar with processes (systems) of foodservice organizations and get acquainted with and understanding of their organizational structure. Have information about what equipment and furnishings are in use in food service organizations and why it is vital to select the right ones. Students will realize the importance and role of the menu and know how to carry out menu planning and evaluation, and learn how to manage purchasing, receiving, storage and inventory. Students will learn how to manage production and service activities in foodservice organizations and understand how to manage quality control, human resources, and operations.		
Course Number: 0603462	Course Name :Food Control and Legislation	Credit Hours :2

Pre-requisite: - (0643453)		
Description The study of the food control development, the modern food control infrastructure; the modern food law and planning of establishing a food control system, food standards and legislations needed for implementation of food laws; the role of local and international organizations in food control; the control of food products and food institutions.		
Course Number: 0603464	Course Name :Total Quality Management Systems	Credit Hours : 3
Pre-requisite: - (Fourth year level)		
Description Students will be introduced to the concept of quality and developments in management of quality and other systems. Have information about the International Organization for Standardization (ISO) and ISO 9000 series of international standards related to quality management. Be familiar with quality management principles and get acquaintance and understanding of vocabulary related to quality and quality management. Be informed about processes and requirements of ISO 9001 standard for quality management. Be familiar with the concepts of quality audit, conformity assessment, laboratory accreditation and good laboratory practice. In the practical part students will learn how to develop, implement and maintain a quality management system based on the ISO 9001. The student will be familiar with what business excellence models are currently in use and how to complement them with the management of other quality systems. Understand what tools are used in quality management and when and how to use them.		

(9) Training, Research, Seminars and Graduation Project

Course Number: 0662490	Course Name: Fundamentals of Employment Readiness (Interpersonal skills and professional Development- General)	Credit Hours : 3
Pre-requisite: - (*)		
Description This course aims to help students acquire the skills, experience and competencies necessary to enter the labor market efficiently, and to make graduates distinguished in their professional fields and able to solve the problems they face by providing them with the skills and competencies required for the labor market. The course will focus on enhancing the technical, professional, and personal capabilities of students while discussing the concepts of leadership, creativity, innovation, productivity, administrative hierarchy, and capacity development. The course also includes a description of the local and regional labor market and the		

jobs available for the academic program, with an introduction to the laws, regulations and legislation in force related to the profession, in addition to presenting the reality of graduates of the School of Agriculture in general. The course is characterized by giving an effective role to experts and pioneers from the public and private sectors to meet with students to discuss the work environment and job requirements in the major, in addition to presenting their experiences in their respective fields.		
Course Number: 0653496	**Course Name :Employment Readiness: Specialized Skills in Food Science and Technology**	**Credit Hours : 3**
Pre-requisite: - (*)		
Description The course aims to provide a comprehensive review of all the skills and competencies required for students in the Food Science and Technology job market. Students' ability to master these skills and competencies will be assessed, including entrepreneurship in food production, human resource management, teamwork, planning and organization, critical thinking, problem-solving, decision-making, and sustainable practices. The course will evaluate students' ability to manage food production, analyze the efficiency of quantitative and qualitative production, and utilize modern systems like ISO and HACCP to maintain and improve the quality and efficiency of food products. The course will also assess students' ability to study the food market, understand consumer requirements, analyze risks during food production, develop new food products, gather and analyze information, and use food tests and continuous monitoring throughout the food chains. Additionally, it will determine the students' ability to produce food products that meet local and international standards, ensure personal and others' safety in the workplace, and correctly use laboratory tools and food manufacturing equipment. Students will be trained to prioritize specific practical activities and set defined timelines to accomplish tasks in the knowledge domains of Food Science and Technology. The course will also include hosting experts to evaluate students' proficiency in the skills and competencies required for the job market. At the end of the semester, the results of the graduation projects will be presented to experts, interested parties, and stakeholders from the job market to assess the readiness of these results for practical application and to evaluate students' ability to perform essential tasks related to the required competencies of the specialization.		
Course Number: 0613496	**Course Name: Training in Food Inspection Institutions**	**Credit Hours: 3**
Pre-requisite: - (**)		
Description		

Involves field training in an institution in one of the fields of food science and technology on the various production operations, food preservation, processing and marketing of products in that institution. The student also acquires the necessary knowledge to manage food establishments, including human resources management and various operations, in addition to quality management, control and assurance.		
Course Number: 0613497	**Course Name :Training in Food Processing**	**Credit Hours: 3**
Pre-requisite: - (**)		
Description Acquire practical training and skills in the food science and technology aspects including, chemical and microbial analysis, food safety, food sensory evaluation. Interpretation of the results, writing the scientific report and determining compliance of the food samples with national and international standards. Active learning will be applied by preparing and analyzing research papers and presenting them to an audience.		
Course Number: 0653497	**Course Name: Scientific Readings and Research Methods in Food Science and Technology**	**Credit Hours : 3**
Pre-requisite: - (**)		
Description Provide the student with practical experience in solving problems related to any aspects related to food science and technology. Adapt practical qualitative and quantitative methodology to solve the problem. A supervising committee will be assigned to follow the progress of the graduation project. Active learning will be applied by preparing and analyzing research data and presenting them to an audience.		
Course Number: 0613499	**Course Name :Training and Graduation Project in Food Science and Technology**	**Credit Hours : 3**
Pre-requisite: - (**)		
Description Providing the student with practical experience in solving problems related to any aspect of food science and technology; by working on project proposals approved by the training committee in the department. Active learning is applied through preparing and analyzing research data and then presenting it to the audience.		

(*) Minimum completion of 89 credit hours successfully, in addition to the department approval.

(**) Completion of (110 credit hours successfully) and passing the following courses: Food Analysis Methods, Food Preservation and Processing, Food Hygiene, Sensory Evaluation of Foods and Total Quality Management System, in addition to the department approval.

Courses offered for Department\Faculty\University Students

Course Number: 0603101	Course Name: Principles of Food and Nutrition	Credit Hours : 3
Pre-requisite: - (0334103)		
Description Introduction to nutrients with respect to classification; dietary sources, functions and body requirements, the concept of balanced diet; the etiology and management of malnutrition. Introduction to types and causes of food spoilage, food preservation, and food-borne diseases, emphasizing the status of nutrition and food industries in Jordan.		
Course Number: 0603233	Course Name :Applied Nutrition in Health and Illness	Credit Hours :3
Pre-requisite: - (0702205 or Sim.)		
Description Basics related to nutrients and food energy in terms of digestion, absorption, metabolism, vital functions, food sources, malnutrition diseases and human needs in different stages of life, methods of evaluating nutritional status, foundations of creating healthy meals, planning nutritional programs, education and nutritional guidance, and the use of food and diets in the treatment and management of some common diseases and chronic diseases of the affluence that affect different body systems.		

Courses offered by other faculties and departments.

Credit Hours: 3	Course Name: Modern Digital Skills	Course Number: 1900103
Pre-requisite: - (1932099)		
Description This course aims to enhance the students' digital knowledge and skills, placing a spotlight on Artificial Intelligence (AI) and cutting-edge digital technologies, to equip them for current and future jobs. The course allows participants to learn the foundations of the digital world and enables them to better utilize technology to advance their careers. The course material includes, but is not limited to: types of data, information, and content; digital identity; digital content creation in all forms; cyber-security and safety; collaborating and working online; global trends and technologies such as Big Data, Cloud Computing, Artificial Intelligence, Internet of Things, Gamification; Balanced use of technology and social media; and digital career competencies needed in the current job market. Aligned with Education for Sustainable Development (ESD) and Sustainable Development Goals (SDGs), it instills responsibility for inclusive and sustainable practices in the digital era. As the digital landscape evolves, the course content is continuously updated to keep students well-prepared and informed about emerging digital technologies shaping the future. The course employs experiential and active learning methods, including interactive lectures, collaborative activities, and the use of digital tools. Assessment methods include exams, assignments, practical tasks and the integration of professional certifications, providing students with hands-on experience and industry-recognized credentials that enhance their career prospects.		
Credit Hours: 3	Course Name: Calculus (1)	Course Number: 0301101
Pre-requisite: - (-)		
Description Functions: domain, operations on functions, graphs of functions; trigonometric functions; limits: meaning of a limit, computational techniques, limits at infinity, infinite limits ;continuity; limits and continuity of trigonometric functions; the derivative: techniques of differentiation, derivatives of trigonometric functions; the chain rule; implicit differentiation; differentials; Roll's Theorem; the mean value theorem; the extended mean value theorem; L'Hopital's rule; increasing and decreasing functions; concavity; maximum and minimum values of a function; graphs of functions including rational functions (asymptotes) and functions with vertical tangents (cusps); antiderivatives; the indefinite integral; the definite integral; the fundamental theorem of calculus ; the area under a curve; the area between two curves; transcendental functions: inverse functions, logarithmic and exponential functions; derivatives and integrals; limits (the indeterminate		

forms); hyperbolic functions and their inverses; inverse trigonometric functions; some techniques of integration.		
Credit Hours : 3	**Course Name: General Physics for Life Sciences**	**Course Number: 0342103**
Pre-requisite: - (-)		
Description Motion in a Straight Line, Motion in two Dimensions, Newton's Laws of Motion, STATICS, Work, Energy, and Power, Linear Momentum, Temperature and the Behavior of Gases, Thermodynamics, Thermal Properties of Matter, Electric Forces, Electric Fields, Electric Potentials, Direct Currents.		
Credit Hours :1	**Course Name: Experimental General Physics for Life Sciences**	**Course Number: 0332113**
Pre-requisite: - (0342103 or Sim.)		
Description Students perform 12 experiments of 3 hr/week duration. These experiments are: Measurements and Uncertainties, Collection and Analysis of Data, Vectors: Force Table, Newton's 2nd Law of Motion, Simple Harmonic Motion: Simple Pendulum, The Falling Sphere Viscometer, The Laws of Gases, Measurement of Resistance, The Potentiometer, Specific Charge of Copper Ions, Introduction to the Oscilloscope, Joule Heat, Lenses.		
Credit Hours: 3	**Course Name :General Chemistry for Life Science**	**Course Number: 0333106**
Pre-requisite: - (-)		
Description This course covers basic topics including: The scientific method, measurements and significant figures, units and dimensional analysis, naming simple inorganic compounds, stoichiometry, basic reactions in aqueous solutions and solution stoichiometry, properties of gases and kinetic molecular theory, measurements and calculations of energy associated with physical changes and chemical reactions, basic quantum theory and the electronic structure of the atoms, atomic periodic properties, ionic bonding, covalent bonding, molecular geometry, and hybridization of atomic orbitals.		
Credit Hours: 1	**Experimental General Chemistry for non-Chemistry Students**	**Course Number: 0333109**
Pre-requisite: - (0333106 or Sim.)		
Description Safety and laboratory rules; chemical observations; Avogadro's number; stoichiometry; volumetric analysis; oxidation and reduction; colligative properties; thermochemistry and equilibrium.		

Credit Hours: 3	Course Name: Organic Chemistry for non-Chemistry Majors	Course Number: 0333233
Pre-requisite: - (0333106)		
Description Hydrocarbons: alkanes, cycloakanes, alkenes, alkynes; aromatic compounds; stereochemistry; halides; alcohols; phenols; ethers; amines; carbonyl compounds and carboxylic acids.		
Credit Hours : 1	Course Name :Practical Organic Chemistry for non-Chemistry Majors	Course Number: 0303239
Pre-requisite: - (0333233 or Sim.)		
Description The course involves separation, purification of and identification organic compounds through their physical properties: melting point, distillation, crystallization, extraction, and chromatography; preparation of simple organic compounds; qualitative tests for selected classes of organic compounds.		
Credit Hours : 3	Course Name :Biology for Life Sciences	Course Number: 0334103
Pre-requisite: - (-)		
Description This course covers the fundamental principles of biology, focusing on the chemical basis of life, cell structure and function, energy transformations, and cellular processes. The course provides a comprehensive overview of biological concepts and processes, preparing students for advanced study in agricultural sciences.		
Credit Hours : 1	Course Name :Practical General Biology (1)	Course Number: 0304111
Pre-requisite: - (0334103 or Sim.)		
Description Laboratory experiments in microscopy and cells, chemical aspects of cells, plant and animal issues, animal and plant physiology. Mammalian anatomy, and systematic of major living groups.		
Credit Hours: 3	Course Name :General Biochemistry	Course Number: 0602301
Prerequisite: (0333233)		
Description This course provides an overview of the structural and functional properties of carbohydrates, lipids, amino acids, proteins, nucleic acids, and biological membranes. Emphasis is placed on enzyme kinetics, catalytic mechanisms, and regulatory processes. The course also introduces key concepts in the metabolism of		

carbohydrates, fats, and proteins, as well as an introduction to signal transduction pathways and their role in cellular communication and regulation		
Credit Hours : 3	**Course Name :Analytical Chemistry**	**Course Number: 0333211**
Pre-requisite: - (0333106)		
Description The scope and importance of analytical chemistry; errors and statistical evaluation of data; equilibrium and equilibrium calculations; gravimetric analysis; volumetric analysis: precipitation titrations, complexometric titrations, acid-base titrations.		
Credit Hours : 1	**Course Name :Experimental Analytical Chemistry**	**Course Number: 0303216**
Pre-requisite: - (0333211 +333109)		
Description The course includes experiments dealing with the following topics: statistical treatment of data; gravimetric analysis; acid-base titrations; precipitation titrations; complex metric titrations; redox titrations, analysis of real samples.		
Credit Hours : 3	**Course Name: Principles of Plant Production**	**Course Number: 0661101**
Pre-requisite: - (0334103)		
Description Horticultural crops including classification, structure, growth and development, reproduction, horticultural environment, horticultural technology, propagation, mineral nutrition, training and pruning, growth regulation, horticultural and production systems		
Credit Hours: 3	**Course Name :Principles of Animal Production**	**Course Number: 0602101**
Pre-requisite: - (0334103)		
Description The student will learn the following topics: Importance of farm animals for production of food; breeds of farm animals (dairy cattle, beef cattle, dairy sheep, mutton sheep, wool sheep, dairy goats, chevon goats, chicken broilers, egg-laying chicken); edible (meat, milk and table eggs) and inedible (animal fiber) animal products; physiology of digestive and reproductive systems; increasing animal productivity through proper management of breeding, nutrition, reproduction and health; classification of feedstuffs based on the content of fiber, protein and energy; an overview on livestock sector in Jordan (population of farm animals, breeds, production of meat, milk and table eggs) and challenges facing this sector within the context of climate change.		
Credit Hours: 3	**Course Name : Pesticides**	**Course Number: 0606351**

Pre-requisite: - (0333106)		
Description Students will learn groups of pesticides, toxicity; chemical structure and nomenclature, methods of application and safety regulations.		
Credit Hours: 3	**Course Name: Biostatistics and Data Analysis**	**Course Number: 0605151**
Pre-requisite: - (1900103)		
Description Study the basic concepts of statistics and the methods used in data collection, analysis and presentation, especially in agriculture. To describe basic principles of data analysis, methods for calculating some statistical measures such as measures of central tendency and dispersion. The concept of simple linear correlation and regression as a method for measuring the relationship between two phenomena. Distinguishing between quantitative and descriptive variables and providing the student with the ability to address some of the problems that they encounter in their working lives in a scientific manner based on a scientific method.		
Credit Hours : 3	**Course Name :Principles of Agricultural Economics**	**Course Number: 0605101**
Pre-requisite: - (0301101)		
Description Economic concepts, resources and systems, analysis of input-output, input-input, and output-output relationships, analysis of costs of production, input and output decisions of agricultural firms, demand and supply and their related elasticities, market equilibrium, determination of prices and quantities, and types of markets. Basic agricultural economic concepts concerning resource use, price determination, and profit maximization are emphasized.		
Credit Hours : 3	**Course Name: Agribusiness Marketing**	**Course Number: 635230**
Pre-requisite: -		
Description The concept and functions of agricultural marketing, methods of determining prices, estimating marketing margins, marketing channels, factors affecting prices and marketing channels, marketing institutions, and methods of conducting marketing studies. The course deals with the various trading activities that affect the sales of products in the food marketing system, and those that occur in retail stores		
Credit Hours : 3	**Course Name :Innovation and Entrepreneurship for Agribusiness**	**Course Number: 0605322**
Pre-requisite: -		
Description		

This course aims to introduce students to the concepts of innovation and entrepreneurship and provide them with the basic knowledge and skills to develop ideas into viable projects in the agricultural sector. This course also uses theoretical and practical methodologies to train students and prepare them to discover opportunities and unleash their energies in this field. It includes the following topics: culture and systems of innovation and creative thinking, entrepreneurship and its modeling, management of agricultural projects and small companies, social entrepreneurship, intellectual property, technology marketing and sources of funding. Success in this course requires students to develop a business plan for a new viable project or idea.

Credit Hours : 3	Course Name :Green Skills and Sustainability	Course Number: 0604334

Pre-requisite: -

Description

Throughout this course, the students' skills and knowledge in sustainability and green skills will be expanded to build more sustainable practices in the land, water, plant and animal husbandry sectors. Students will learn how to identify sustainability issues, conduct environmental surveys, restore habitats, and understand conservation methods. The course combines academic studies with practical learning in a variety of settings, providing learners with real-world experience. The course will also cover topics such as carbon neutrality, working towards net zero, and how to increase sustainability in agriculture and the environment. Emphasis will be placed on promoting low-carbon technology to help advance education in agricultural areas and create a new understanding of a sustainable future. The agricultural sustainability management approach will contribute to future options for addressing environmental and sustainability issues within the Sustainable Development Goals.

Credit hours: 3	Food Security	Course Number: 0645441

Prerequisite: -

Description

The Arab agriculture, land and water resources, land use and the production pattern in the Arab countries, agricultural policies, the share of agriculture in GDP and employment and the development of their relative importance. Describe and analyze interdependencies between the Arab agriculture and integration in economic development, the Arab free trade area, and intra-Arab agricultural trade, total and agricultural trade balance and food gap in Arab countries. Strategic components and approaches of food security, policies and tools of nutrition and food security, integrated food plan, food balance sheet, principles of food self-reliance, global food security, food security in the Arab countries and in Jordan.