1.	School	**Agriculture**
2.	Department	**Nutrition and Food Technology**
3.	Program title (Arabic)	دكتوراه في علم وتكنولوجيا الغذاء
4.	Program title (English)	**Ph. D in Food Science and Technology**

	Specialization #	Degree	Dep #	School #	Year	Track
Plan Number	032	9	3	6	2014	Thesis

الخطة الدراسية المعتمدة

First: General Rules & Conditions:

1. This plan conforms to valid regulations of the programs of graduate studies.
2. Specialties of Admission:
   - The First priority: M.Sc. in Food Science and Technology
   - The Second priority: M.Sc. in Nutrition and Food Technology
   - The Third priority: B.Sc. in Nutrition and Food Technology at the same time has M.Sc. in Chemistry or Chemical Engineering or Biological Science or Management.
3. Admission policies: The First Policy will be adopted

Second: Special Conditions: None.

Third: Study Plan: Studying (54) Credit Hours as following:

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

Course No.	Course Title	Credit Hrs	Theory	Practical	Pre/Co-requisite
0641901	Experimental Design and Analysis	3	3	-	-
0603911	Enzymes in Food Science	3	3	-	-
0603932	New Food Product Development	3	3	-	-
0603933	Biotechnology in Food and Nutrition	3	3	-	-
0603935	Advanced Food Quality Control	3	3	-	-
0603942	Toxicology in Food and Nutrition	2	2	-	-
0603972	Policies and Planning in Food and Nutrition	3	3	-	-
0603992	Seminar in Food Science	1	1	-	-

2. Elective Courses (15) Credit Hours: from the following:

Course No.	Course Title	Credit Hrs	Theory	Practical	Pre/Co-requisite
0603926	Food Flavors and Colors	3	3	-	-
0603930	Food Sensory Evaluation	3	3	-	-
0603934	Effect of Processing on Food Properties	3	3	-	-
0603941	Functional Foods	2	2	-	-
0603943	Arabic Traditional Foods	3	3	-	-
0603975	Food Legislations	3	3	-	-
0603994	Selected Topics in Food Science	3	3	-	-

3. Pass the qualifying exam : (0603998)
4. Thesis: (18) Credit hours (0603999)
5. Arabic Language Exam (2501700)

*notes

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Course description

(0641901) Experimental Design and Analysis (3 Credit Hours)
Advanced statistical method and concepts in designing experiments and analysis applied to agricultural experiments, such as incomplete block designs, lattice designs and lattice squares. Methods of combining experiments over years and locations, experiments of unequal size, tests of the treatments and places interactions, and repetitions in both space and time.

(0603911) Enzymes in Food Science (3 Credit Hours)
The course deals with the general kinetic principles governing enzyme behavior. It also covers the sources of food enzymes, their immobilization, Assay & various forms. General characteristics and occurrence of carbohydrate enzymes, lipases, and proteases as well as oxido-reductases are covered. Application of enzymes in the baking and milling industries, as well as starch and syrup industry , dairy industry and fruit and vegetable processing is discussed . Finally the course studies the nutritional and health aspects of enzyme utilization. It also covers the use of enzymes in food analysis and some aspects of enzymes and bioengineering.

(0603926) Food Flavors and Colors (3 Credit Hours)
The course covers the physical and chemical characteristics of natural and synthetic food colors and flavors, as well as their isolation, concentration and analysis. It also deals with their biosynthesis in the biological systems and the physiology of color and flavor perception, and the changes they undergo during processing and storage of foods.

(0603930) Food Sensory Evaluation (3 Credit Hours)
Sensory methods in quality control operations, sensory data analysis, sensory program design and initiation and descriptive sensory methods.

(0603932) New Food Product Development (3 Credit Hours)
An advanced study of the development of new food products with respect to history, criteria used, driving forces and stages according to ISO and other established bench marks. The course also covers ingredient function and selection, role of sensory analysis, consumer satisfaction and quality motivation in product development and roles of packaging and preservation in marketing and innovation . The course includes case studies of important success stories in new food products.

(0603933) Biotechnology in Food and Nutrition (3 Credit Hours)
Study of the applications of biotechnology in food examination; production of food substitutes and modification of food functional properties; unit operations that are used in biotechnology, bioreactors, and in bioconversion of raw materials; biotechnology of vitamins, growth factors, hormones, and amino acids regarding their production, modification, and the know how of their use in food enrichment; regulatory and social aspects of food and nutrition biotechnology.

(0603934) Effect of Processing on Food Properties (3 Credit Hours)
Study of the effect of processing on food quality and its impact on the nutritional value. Also study of methods of minimizing problems and adverse interactions associated with food processing.

(0603935) Advanced Food Quality Control (3 Credit Hours)

The course covers such topics as food quality control management including quality policy and objectives, quality attributes, process approach etc. The course also covers the principles and practices of total quality management as well as its tools and techniques .Quality systems and their audit process, sampling and charting; statistical tools in quality activities such as probability, data distribution, ANOVA, sampling and charting as well as process capability and process control to be also covered.

(0603941) Functional Foods (2 Credit Hours)

A postgraduate level course that discusses the different categories of functional foods: neutraceuticals (including micronutrients), microbiological preparations ((probiotics & prebiotics) active amines, organic acids and phytochemicals claimed to be beneficial to health. The claims, fads associated with such food components and their applications in the prevention and treatment of complicated chronic diseases such as cancer, C.N.S disabling diseases, obesity, immune deficiencies and diseases of the elderly are focused upon.

(0603942) Toxicology in Food and Nutrition (2 Credit Hours)

Study of various types of chemical and biological food toxicants and their animal and plant sources, particularly natural toxicants and those resulting from pollution or food processing, as well as food additives and heavy metals; the chemistry of these toxicants, analytical methodologies, physiological effects and means of removal and detoxification; methods of biological assays and related legal problems and legislations; methods of estimation and assessment of their toxicity in man.

(0603943) Arabic Traditional Foods (3 Credit Hours)

Advanced discussion of the genesis and development of the Traditional Arab Foods and the influence of Arab culture on its development and quality . The course covers the effect of the environment on the development , preservation and spread of the Arab foods. It also discusses the role of the Islamic jurisprudence on the formation of the dietary patterns in the Arab world. Examples from nonarab cultures are also discussed. The course includes research papers on the relationship between the anthropology , environment and food.

(0603972) Policies and Planning in Food and Nutrition (3 Credit Hours)

The course deals with the goals of food and nutrition policies; their developments and information required , as well as some concepts and practical considerations in planning; also it deals with evaluation of food and nutrition programs .

(0603975) Food Legislations (3 Credit Hours)

The importance and development of food legislation , food standards , codes of practice and specifications; formulation of food standards and food legislation activities at the national and international level including agencies such as: Codex Alimentarius, food legislation in the European economic community, the international standards organization and WHO/FAO.

(0603992) Seminar in Food Science (1Credit Hours)

Oral reports and discussions of current research advances food science, particularly those related to student research subject, designed to broaden understanding of problems and stimulate research.

(0603994) Selected Topics in Food Science (3 Credit Hours)

Study of the advanced research topics in food technology, not covered in other postgraduate courses. Approval of the Department is required.

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