Course Specifications

Course Title:	**Genetically Modified Food**
Course Code:	**206303-3**
Program:	**Bachelor in Food Science and Nutrition**
Department:	**Food Sciences and Nutrition Department**
College:	**College of Science**
Institution:	**Taif University**

Table of Contents

A. Course Identification:

1. Credit hours: 3 Hours	

2. Course type

a. University ☐ College ☐ Department √ Others ☐

b. Required √ Elective ☐

3. Level/year at which this course is offered: ١٢th Level/ ٤nd year

4. Pre-requisites for this course (if any): **Molecular Biology (2062240-3)**

5. Co-requisites for this course (if any): **None**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	٥	100%
2	**Blended**	---	---
3	**E-learning**	---	---
4	**Distance learning**	---	---
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	٢0
3	**Tutorial**	---
4	**Others** (specify)	---
	Total	٥0

B. Course Objectives and Learning Outcomes:

1. Course Description

This course gives you deeper insight into:

- What genetically modified food are, how they are developed, as well as current legislation, and potential risks and benefits associated with them.
- The application of different traditional and modern techniques for creation and characterization of genetic traits of plants- Application of modern techniques of genetic engineering and plant tissue culture for improvement of preferred economic traits (increase of productivity and improvement of nutritional properties of agricultural crops) or exclusion of non-preferred traits.

2. Course Main Objective:

After successful completion of the course, students will be able to:
- Define genetically modified foods
- Explain the genetic approaches for plant genetic improvement
- Explain the use of molecular markers in plant genetic improvement
- Recognize the use of tissue culture in plant genetic improvement
- Describe the potential benefits and risks of GM foods, including possible health effects.

3. Course Learning Outcomes:

CLOs		Aligned PLOs
1.0	**Knowledge and understanding**	
1.1	Recognize the concepts of genetically modified food are, how they are developed.	**K1**
1.2	Describe and outline the role of genetics in improving plant food products.	**K3**

	CLOs	Aligned PLOs
2.0	**Skills:**	
2.1	Diagram the use of genetic analysis in improving food products.	**S4**
2.2	Apply different approaches to improve plant food products.	**S2**
3.0	**Values:**	
3.1	Cooperate to work in groups and accept the teamwork concept in various field of genetically modified food.	**V1**
3.2	React with the modern technology to prepare reports in genetically modified food.	**V2**
3.3	Lead his colleague in the team work	**V3**

C. Course Content:

No	List of Topics	Contact Hours
1	Introduction to genetically modified food and plant genetic improvement	3
2	Nucleic acids structure and function.	3
3	Sources of Genetic variations, mutations, recombination, changes in chromosome number, and polyploidy	3
4	Gene transfer in plant improvement- gene isolation, cloning of gene of interest	3
5	Preparation of molecular construct (plasmid) for transformation, types of gene transfer	3
6	Marker assisted selection in plant improvement	3
7	Improvement of the quality of plant products, commercial transgenics	3
8	Production of novel plant products, commercial transgenics	3
9	Improvement of nutritional value of plant products, commercial transgenics	3
10	The International and domestic law on genetic modified food.	3
Total		**30**
Experimental Topics		
1	Safety measures in molecular biology lab.	2
2	Buffers preparation, micro-pipetting exercise and calculation.	2
3	Bioinformatics tools: DNA analysis, and primer design.	2
4	Use of molecular techniques in identifying genetically modified food: DNA extraction from Food.	2
5	Set up Polymerase chain reaction (PCR)	2
6	Agarose Gel Electrophoresis (AGE), Gel documentation & photography.	2
7	Principles of plant tissue culture	2
8	Digestion of DNA with restriction enzymes	2
9	Gene cloning and Molecular Maps	2
10	General revision	2
Total		**20**

D. Teaching and Assessment
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**		
1.1	Recognize the concepts of genetically modified food are, how they are developed.	- Lectures	- Written exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.2	Describe and outline the role of genetics in improving plant food products.	- Lecture	- Written exam
2.0	**Skills**		
2.1	Diagram the use of genetic analysis in improving food products.	- Labs	- Practical exams
2.2	Recognize different approaches to improve plant food products.	- Lectures - practical	- Written and Practical exams
3.0	**Values**		
3.1	Cooperate to work in groups and accept the teamwork concept in various field of genetically modified food.	- Work in group	- Lab reports
3.2	Support the modern technology for explanation the basis of genetically modified food.	- Educational Videos	- Lab report
3.3	Initiate to research in the audiovisual media to presentation of the data of the genetic modified food.	- Research activities	- Achievement's portfolio

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignment and Interaction during lectures	Continues	10%
2	Midterm exam	5-6	20%
3	Weekly Lab. Reports	Continues	20%
4	Practical exam	11	10%
5	Final exam	12	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support:

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:
- There are 6 h per week for this purpose and the students know these hours according to the time of professor who teach the course.
- Student satisfaction surveys are conducted for academic guidance.
- Develop an improvement plan for academic guidance based on the results of the questionnaire analysis.

F. Learning Resources and Facilities

1.Learning Resources:

Required Textbooks	- Genetically Modified Crops: Their Development Uses and Risks, 2004 by G H,; D Z Skinner eds, Liang - Principles of plant genetics and breeding, 2012., Acquaah, G., Wiley- Blackwell. - Plant Biotechnology and Genetics, 2008, J. Wiley, Neal Stewart JR - Genetic improvement of bioenergy crops,2008, Vermerris, W. - Principles of plant genetics and breeding, 2007., Acquaah, G.
Essential References Materials	- Genetically Modified Crops: Their Development Uses and Risks, 2004 by G H , ; D Z Skinner eds, Liang
Electronic Materials	- https://www.researchgate.net/publication/320548309_Genetic_Improvement_of_Tropical_Crops - https://link.springer.com/content/pdf/10.1007/978-0-387-70805-8.pdf - http://gtu.ge/AgroLib/Principles%20of%20Plant%20Genetics%20and%20Breeding.pdf
Other Learning Materials	- http://eds.b.ebscohost.com.sdl.idm.oclc.org/eds/detail/detail?vid=1&sid=0ae27f60-d75c-4c5d-9858-eb291d18f7d4%40pdc-v-sessmgr02&bdata=JnNpdGU9ZWRzLWxpdmU%3d#AN=edsgcl.6915900014&db=edsgvr

	• http://eds.a.ebscohost.com.sdl.idm.oclc.org/eds/pdfviewer/pdfviewer?vid=2&sid=d52b69ad-3d90-48b5-8436-603dc471097e%40sessionmgr4009

2. Facilities Required:

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classroom (capacity not more than 40 students) for 3 h/week. • Lab (capacity not more than 20 students) for 3 h/week
Technology Resources (AV, data show, Smart Board, software, etc.)	• Data Show projectors, smart blackboard. • Computer Portable PowerPoint presentations to special lectures.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• Data Show projectors, smart blackboard. • Computer Portable PowerPoint presentations to special lectures.

G. Course Quality Evaluation:

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students, faculty, program leaders and Peer Reviewer	• Continuous monitoring by directors of program and quality assurance unit (Direct). • Applying Questionnaires received from the Deanship of Academic Development for Student evaluation (indirect). • Evaluation of course report (indirect).
Extent of achievement of course learning outcomes	Students, faculty, program leaders and Peer Reviewer	• Applying Questionnaires for Student evaluation (indirect). • Evaluation of course report (indirect).
Quality of learning resources	Faculty, program leaders, administrative staff, independent reviewers.	• Continuous monitoring by directors of program and quality assurance unit (Direct). • Applying Questionnaires for Student evaluation (indirect). • Evaluation of course report (indirect).

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Department council - Academic Development Committee
Reference No.	Department council NO: 5 Subject NO: 2
Date	08 /07 /1444 H

علوم الغذاء والتغذية **TU**
Food Science and Nutrition   جامعة الطائف
Department   TAIF UNIVERSITY