



Course Specifications

Course Title:	Fats and Oils Technology
Course Code:	2063203-3
Program:	Bachelor in Food Science and Nutrition
Department:	Food Sciences and Nutrition Department
College:	College of Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3 Hours
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 9 th Level / 3 rd year
4. Pre-requisites for this course (if any): Fundamentals of Food Industries (2062102-3)
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	√	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	30
3	Tutorial	---
4	Others (specify)	---
	Total	60

B. Course Objectives and Learning Outcomes:

1. Course Description

This course is planned to impart the knowledge and different skills about fats and oils technology, sources, classification, extraction methods, physico-chemical characteristics, refining methods, hydrogenation, deterioration and preservation, manufacture of some oil products and essential oils.

2. Course Main Objective:

- 1) The considerations about fats and oils production, nutrition, sources, structure and physico-chemical characteristics.
- 2) Different extraction, refining and hydrogenation methods.
- 3) Fats and oils deterioration and antioxidant mechanism.
- 4) Some fat and oil products.

3. Course Learning Outcomes:

CLOs		Aligned PLOs
1.0	Knowledge and understanding	
1.1	Recognize fats and oils different characteristics.	K 3
1.2	Describe the different industrial methods used in fats and oils production.	K 3
1.3	Discuss the fats and oils deterioration and antioxidants mechanisms	K 3
1.4	Define some fat and oil product characteristics	K 3
2.0	Skills:	
2.1	Measure the composition and characteristics of crude and refined fats and oils and their products	S4
2.2	Determine the validity or adulteration of fats and oils	S4
2.3	Innovate solutions to industrial or laboratory problems	S5

CLOs		Aligned PLOs
3	Values:	
3.1	Cooperate during laboratory experiments	V 1
3.2	Support both oral and written excellence for data presentation	V 2

C. Course Content:

No	List of Topics	Contact Hours
1	Introduction, sources, classification of lipids (local and global situation-nutrition and economic considerations-different sources-classification of lipids-classification of fatty acids)	3
2	Physico-chemical characteristics of fats and oils (Types of triglycerides-Hydrolysis of fats and oils-Acidolysis of fats and oils-Alcoholysis and glycerolysis of fats and oils-solubility, melting point, light rotation....etc.)	3
3	Extraction of fats and oils from different sources (extraction of animal fats by rendering or digestion-extraction of milk fat by centrifugation-extraction of oils from different plant sources by mechanical and solvents processes)	6
4	Refining of fats and oils processing (degumming-bleaching-neutralization-deodorization)	3
5	Hydrogenation of oils (identification and importance of hydrogenation-types of catalyst-chemical reaction of hydrogenation-the factors effects in the hydrogenation-selective hydrogenation-changes happened during the hydrogenation)	3
6	Deterioration of fats and oils and the antioxidant (oxidative rancidity-enzymatic rancidity-hydrolytic rancidity-ketonic rancidity-antioxidants types and sources-mechanism of antioxidant work)	3
7	Manufacture of Margarine and Mayonnaise (brief history-identification of different emulsion types-identification of the product-roll of the product components-preparation-spoilage and preservation)	3
8	Manufacture of olive oil (composition – extraction – preservation)	3
9	Essential oils (identification of essential oils-chemical structure-extraction methods-raw materials-some application of essential oils in food products)	3
Total		30
Experimental Topics		
1	Extraction of fats and oils from different sources	3
2	Physical characteristics of fats and oils	3
3	Acid value, Saponification value, Ester value	3
4	Iodine value - Peroxide value	3
5	Para-anisidin value - Kreis test	3
6	Thiobarbituric acid number - Ultra-violet absorption	3
7	Detection of adulteration in fats and oils	3
8	Detection of Lard	3
9	Preparation of mayonnaise	3
10	Preparation of Peanut butter	3
Total		30

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 fats and oils different characteristics.	Lecturer - Practical.	Written and practical exams
1.2	Describe the different industrial methods used in fats and oils production.	Lecturer - Educational Videos – scientific	Written exams - reports
1.3	Discuss the fats and oils deterioration and antioxidants mechanisms	Lecturer – Practical.	Written and practical exams
1.4	Define some fat and oil product characteristics	Lecturer – Practice.	Written and practical exams
2.0	Skills		
2.1	Explain the effect of different refining methods on the composition and characteristics of fats and oils and their products	Write a short report	Written exam Report evaluation
2.2	Determine the validity or adulteration of fats and oils	Lecture - Practical	Written exam Practical exam
2.3	Innovate solutions to industrial or laboratory problems	Practical demonstrations	Practical exam
3.0	Values		
3.1	Cooperate during laboratory experiments	Practical lessons	Practical exam
3.2	Visit the scientific websites and Library for preparation reports.	Work in small groups and e-learning	Report evaluation

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	Michael Bockisch (1998). Fats and Oils Handbook. AOCS press, Hamburg, Germany (https://www-science-direct-com.sdl.idm.oclc.org/science/article/pii/B9780981893600500184) - Shahidi F. (2006). Bailey's Industrial Oil and Fat Products 6 th Ed., John Wiley and Sons, Inc., Hoboken, New Jersey, USA.
Essential References Materials	O'Brien R. (2004). Fats and Oils Formulating and Processing for Applications. 2 nd Ed., CRC Press LLC, 2000 N.W. Corporate Blvd., Boca Raton, Florida. Basır K. H. C. and Buchbauer G. (2010). Handbook of Essential Oils Science, Technology, and Applications. ., CRC Press LLC, 2000 N.W. Corporate Blvd., Boca Raton, Florida.
Electronic Materials	<ul style="list-style-type: none"> • Wikipedia • ScienceDirect • SpringerOpen • Wiley • PubMed
Other Learning Materials	Information technology

2. Facilities Required:

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Classroom (capacity not more than 40 students) for 3 h/week. - Laboratory (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 - PowerPoint presentations.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	- None

G. Course Quality Evaluation:

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students, faculty, program leaders and Peer Reviewer	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Applying Questionnaires for Student evaluation (indirect). • Evaluation of course report (indirect).
Quality of learning resources	Faculty, program leaders,	<ul style="list-style-type: none"> • Continuous monitoring by

Evaluation Areas/Issues	Evaluators	Evaluation Methods
	administrative staff, independent reviewers.	directors of program and quality assurance unit (Direct). <ul style="list-style-type: none"> • 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: 2	Subject NO: 1
Date	30 /02 /1444 H	