



Course Specifications

Course Title:	Food Metabolism
Course Code:	2063104-3
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 H			
2. Course type			
a.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>
b.	Required <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Others <input type="checkbox"/>
3. Level/year at which this course is offered: 7 th Level/3 rd year			
4. Pre-requisites for this course (if any): Chemistry of Food Components (2062203-3)			
5. Co-requisites for this course (if any):			

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	Correspondence	---	---
5	Other	---	---

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	---
4	Others (specify)	---
Total		50

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes:

<p>1. Course Description Generation of metabolic energy in higher organisms- regulation at the molecular, cellular and organ level- biological oxidation -free radicals and antioxidants. Chemical and mechanisms of enzymatic catalysis.</p>
<p>2. Course Main Objective</p> <ol style="list-style-type: none"> 1) Recognize the major classes of food metabolism like carbohydrates metabolism, lipids metabolism, amino acids (protein) metabolism. 2) Show the different metabolic pathways of glucose and other small molecules. 3) Show the structure and functions of different enzymes responsible about food metabolism 4) Memorize the important and biological effects of different kinds of hormones in metabolic process. 5) List the scientific concepts of roles of some vitamins in the regulation of carbohydrate, lipid, and protein metabolism. 6) Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web-based reference material, changes in content as a result of new research in the field). 7) There are several plans in order to improve the course such as following the recent books and publications in this field to update the knowledge. 8) Moreover, increasing the practice time in the laboratory and applied the practical experiments to detected the undesirable substances to evaluate the human health.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding:	
1.1	Recognize the transfer and utilization of energy in biological systems	K1
1.2	Recognize the types of prooxidants and antioxidants	K1
1.3	List the mechanisms of carbohydrates metabolism including glycolysis, citric acid cycle, gluconeogenesis and glycogenolysis	K1
2	Skills:	
2.1	Design, skillfully and professionally the solvent of the problems which come from major steps of oxidative phosphorylation and solve problems about mechanism of antioxidants work.	S1
2.2	Apply mathematics, biostatistics and data analysis in applied food metabolism and energy production.	S1
2.3	Classify the role of different enzymes in food metabolism and using the different determination methods to evaluate the human health.	S1
3	Values:	
3.1	Support to communication both oral and written for data presentation and explanation of food metabolism related issues.	V2
3.2	Support both oral and written excellence for data presentation and explanation of food metabolism related issues.	V3

C. Course Content:

No	List of Topics	Contact Hours
1	I - Biological oxidation - Bioenergetics (Biochemical Thermodynamics). - Biologic oxidation: Enzymes and co-enzymes involved in biological oxidation. - Electron transport chain and oxidative phosphorylation.	3
2	II- Pro-oxidants and antioxidants - Pro-oxidants - Reactive oxygen species - Reactive nitrogen species - Transition metals - Antioxidant - Oxidative stress - Physiological roles and pathological effects of Pro-oxidants.	3
3	III- Carbohydrates metabolism - Metabolic pathways of glucose: - Glycolysis, Oxidative decarboxylation of pyruvate to acetyl CoA, Citric acid cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis, Hexose monophosphate shunt & Uronic acid pathway.	6
4	- Regulation of blood glucose levels	3
5	V-Lipids metabolism: - Digestion and absorption. - Types of body lipids	3
٦	- Fatty acid synthesis and elongation & Synthesis of triglycerides. - Metabolism of adipose tissue	3
٧	- Metabolism of ketone bodies. - Cholesterol metabolism. - Metabolism of phospholipids. - Prostaglandins and related compound	3
٨	IV- Protein metabolism - Metabolic fate of amino acids (deamination – transamination - trans-deamination). - Metabolism of Ammonia & ammonia toxicity.	3
٩	- Urea cycle.	3

	<ul style="list-style-type: none"> - Metabolism of individual amino acids & their biological role: Glycine; serine Sulphur-containing amino acids (cysteine & methionine) Aromatic amino acids (phenylalanine-tyrosine – tryptophan) - Basic amino acids (lysine- arginine- histidine) - Acidic amino acids (aspartic – glutamic) 	
Total		۳۰
Practical Topics		
1	- Guidelines for working in food metabolism laboratory - Laboratory safety precautions - Practical guidelines.	۲
2	- Determination of blood glucose level chemical and enzymatic methods	۴
3	<ul style="list-style-type: none"> - Lipids and lipoproteins: - Determination of serum triglycerides 	۲
4	<ul style="list-style-type: none"> - Determination of total cholesterol - Determination of heart enzymes (LDH,CPK) 	۲
5	<ul style="list-style-type: none"> - Lipids and lipoproteins (continued): - Determination of HDL- cholesterol 	۲
6	- Determination of LDL-cholesterol	۲
7	- Tests for evaluation of liver function (continued)	۴
8	- Kidney function tests	۲
Total		۲۰

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 transfer and utilization of energy in biological systems	Lecture	Written exam
1.2	Recognize the types of prooxidants and antioxidants	Lecture	Written exam
1.3	List the mechanisms of carbohydrates metabolism including glycolysis, citric acid cycle, gluconeogenesis and glycogenolysis.	Lecture- - practical	Oral evaluation Lab reports
2.0	Skills		
2.1	Design, skillfully and professionally the solvent of the problems which come from major steps of oxidative phosphorylation and solve problems about mechanism of antioxidants work.	Discussion	Written exam Lab reports
2.2	Apply mathematics, biostatistics and data analysis in applied food metabolism and energy production.	Creative problem solving	Worksheets
2.3	Explain the role of different enzymes in food metabolism and using the different determination methods to evaluate the human health.	Assignment and Self-learning	Continuous evaluation Discussion and opinion evaluation
3.0	Values		
3.1	Support to communication both oral and written for data presentation and explanation of food metabolism related issues.	Project	Observation, discussion
3.2	Response to suitable audiovisual media in presentation of the data of the different practical biochemistry and body fluids analysis.	Work in groups	Evaluation of the results of each group.

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 5 h per week for this purpose and the students know these hours according to the time of professor who teach the course.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- Principles of Medical Biochemistry, 3th ed., G. Meisenberg, W. H. Simmons, Elsevier Inc., 2012. ISBN 13: 978-0-323-07155-0 - Lecture notes of Biochemistry II prepared by instructors. 1. Lippincott's illustrated Reviews of Biochemistry 5th ed., R. Harvey and D. Ferrier, 2011, Lippincott's, ISBN:978-1-60913-998-8
Essential References Materials	- Biochemistry 7th Ed., Campbell and Farrell, Brookscole, Cengage Learning, 2012 - Biochemistry 6th Ed., J.M. Berg, J.L. Tymoczko, and L. Stryer, W.H. Freeman Company.
Electronic Materials	- Journal of food metabolism - Journal of antioxidants
Other Learning Materials	- None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- One Lecture hall with comfortable seats (about 50 m ²)
Technology Resources (AV, data show, Smart Board, software, etc.)	- Laptop and Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	- specify, e.g. if specific laboratory equipment is required, list requirements or attach list

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student evaluation by students Organized every semester.	Students	- Direct - indirect
Learning resources	- Program leaders - Staff member - Students	- indirect
Effectiveness of teaching and assessment	- Students	- 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: ٢
Date	08 /07 /1444 H	