



Course Specification

— (Bachelor)

Course Title: Molecular Nutrition
Course Code: 2053203-3
Program: Bachelor in Biotechnology
Department: Biotechnology Department
College: College of Science
Institution: Taif University
Version: V4
Last Revision Date: 3/1445 – 9/2023



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A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lecture, 1 Lab)					
2. Course type					
A.	<input type="checkbox"/> University	<input type="checkbox"/> College	<input checked="" type="checkbox"/> Department	<input type="checkbox"/> Track	<input type="checkbox"/> Others
B.	<input checked="" type="checkbox"/> Required		<input type="checkbox"/> Elective		
3. Level/year at which this course is offered: (6th Level/ 3rd Year)					
4. Course general Description:					
This course is concerned with the chemical and biochemical components of food and nutrients, regulatory effects of nutrients on cell function and cellular signaling, nutrient regulation of gene expression, how food components influence metabolism and growth in eukaryotic systems, manipulation of metabolic processes through nutrient supply, how our genomes respond to food components (nutraceuticals), and how food components regulate our genome and gene expression (nutrigenomics).					
5. Pre-requirements for this course (if any):					
2053101-3, Biochemistry					
6. Co- Pre-requirements for this course (if any):					
None					
7. Course Main Objective(s):					
Explain the regulatory effects of nutrients on cellular signaling processes and gene expression and study how variation in genomic sequence is likely to impact on nutrients' influence on gene expression.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	E-learning	45	100%
3	Hybrid <ul style="list-style-type: none"> ● Traditional classroom ● E-learning 		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
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1.	Lectures	30
2.	Laboratory/Studio	15
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize the molecular mechanisms of nutrients and their regulatory roles on the different organization levels of a living organism.	K.2	Lecture	Written Exams
1.2	Explain the molecular mechanisms of nutritional factors and their role in gene expression, signaling and development.	K.4	Lecture	Written Exams
2.0	Skills			
2.1	Evaluate the effect of food components on metabolism and gene expressio	S2	Project	Written exam (Practical)
3.0	Values, autonomy, and responsibility			
3.1	Agree with the academic values and morals	V1	Discussion	Report

C. Course Content

No	List of Topics	Contact Hours
1.	Molecular nutrition - definition - applications - nutritional genetics	2
2.	Nutrients: macronutrients and micronutrients (Carbohydrate- protein), the importance of nutrients on health outcomes and disease prevention	4





3.	Nutrients: macronutrients and micronutrients (Lipids- Vitamins), the importance of nutrients on health outcomes and disease prevention	4
4.	Food Metabolism (Carbohydrate- protein – Lipids- Vitamins-)	4
5.	Nutrients' effect on gene expression (intracellular pathways, regulation of transcription factors, and/or epigenetic changes)	٤
6.	Genetic factors that influence nutritional requirements, micronutrients (carotenoids , selenium, zinc and folate.....) interact with genetic factors to influence health and susceptibility to disease	4
7.	Food components and the incidence of some diseases (molecular mechanisms of allergy - immune diseases - cellular cholesterol regulation - blood pressure - etc.)	٤
8.	Diet at the molecular level (DNA methylation and cancer)	٤
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	Week 7	20%
2.	Periodical exam	Week 10	10%
3.	Report	Week 11	10%
4.	Practical Exam	Week 15	20%
5.	Final Exam	Week 16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<p>- David H, George LB, Vay LW, John M. Nutritional Oncology. Tokyo, Academic Press Publishing, 2006.</p> <p>- Nutritional Sciences: From Fundamentals to Food: Michelle McGuire and Kathy A. Beerman ISBN (2007): 0534537170, Reserve Room Call Number: TX 364 M34 2007</p> <p>--Van Ommen B., Bouwman J., Dragsted L.O., Drevon C.A., Elliott R., de Groot P., Kaput J., Mathers J.C., Muller M., Pepping F., et al. Challenges of molecular nutrition research 6: The nutritional phenotype database to store, share and evaluate nutritional systemsbiology studies. Genes Nutr. 2010;5:189–203. doi: 10.1007/s12263-010-0167-9.[PMC free article][PubMed][Cross Ref]</p>
Supportive References	Essentials of Human Nutrition: Jim Mann and A. Stewart Truswell ISBN (2012): 0198508611, Reserve Room Call Number: QP 141 E87 2012
Electronic Materials	<p>- <i>Molecular Nutrition & Food Research</i> onlinelibrary.wiley.com</p> <p>- https://www.cabi.org/bookshop/book/9780851996790</p>



	www.wiley-vch.de/.../286-molecular-nutrition-food-research-2216-e
Other Learning Materials	https://www.wiley.com/college/boyer/0470003790/animations/animations.htm Interactive Biochemistry
	Online videos of cellular process, divisions, movement, communications

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One classroom with internet connection for 2 hours a week and one laboratory for 3 hours a week with internet facility.
Technology equipment (projector, smart board, software)	1. Projector for each classroom 2- Projector in each laboratory
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer Review, Students	Direct (Independent Reviewer), Indirect (survey)
Effectiveness of Students assessment	Faculty members	Direct (Random Correction)
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Faculty members	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL
REFERENCE NO.	6
DATE	5/11/2023