هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	**Molecular Developmental Biology**
Course Code:	**2053205-3**
Program:	**Bachelor in Biotechnology**
Department:	**Biotechnology Department**
College:	**College of Science**
Institution:	**Taif University**
Version:	**V4**
Last Revision Date:	**3/1445** – 9/2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lecture, 1 Lab)					
2. Course type					
A.	☐ University	☐ College	☒ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (6th level / Year3)					
4. This module introduces the molecular bases of development in both plants and animals as well as how developmental programs are remarkably conserved among species including humans. The topics include the molecular mechanisms (genetics, epigenetics, pathways) of cell differentiation and organogenesis supported with actual examples e.g. HOX-genes or/and DPX-genes actions as examples of normal molecular developmental control. Other topics will include vertebrate limb cell specification, RNA interference, microtubular motors, floxed genes, vertebra formation, neural crest differentiation and specification, heart cell specification, digit determination, and the developmental origins of feathers, jaws, and teeth. The course also will cover the molecular bases of plant photomorphogenesis, organ development, (the development of roots, shoots, leaves), life cycle events such as embryogenesis, seedling development, transition to flowering, gametogenesis, fertilization, and flowering.					
5. Pre-requirements for this course (if any)**:**					
Immunology, 2053104-3					
6. CO-requirements for this course (if any): NONE					
None					
7. Course Main Objective(s):					
The objective of this course is to describe the meaning of embryogenesis in plants and animals, and to define the factors affecting cell differentiation and embryogenesis. The students are targeted to be able to design experiments for embryogenesis observation.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid ● Traditional classroom ● E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
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	Outline the molecular bases of cell differentiation, embryogenesis, and organogenesis in plants and animals including epigenetics and RNA interference.	**K1**	Lecture	Written Exams
1.2	Recognize molecular bases of plant photomorphogenesis, organ development, (the development of roots, shoots, leaves), life cycle events such as embryogenesis, seedling development, transition to flowering, gametogenesis, fertilization, and flowering.	**K3**	Lecture	Written Exams
2.0	**Skills**			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Evaluate the various molecular processes controlling molecular development in plants and animals	**S1**	Lecture ,Project	Written Exams (Practical)
2.2	Practice problem solving and critical thinking	**S4**	Project	Report
3.0	**Values, autonomy, and responsibility**			
3.1	Initiate independence and responsibility	**V4**	Discussion	Report

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to molecular developmental biology	**2**
2.	Molecular approaches for molecular developmental biology; epigenetics, RNA interference	**6**
3.	Molecular bases of gametogenesis, fertilization, and embryogenesis in plants	**6**
4.	Molecular bases of gametogenesis, fertilization, and embryogenesis in animals	**6**
5.	Molecular bases of organogenesis, and development and life cycle in animals	**6**
6.	Plant morphogenesis and development; molecular regulation of transition to flowering, seed formation, and senescence	**4**
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 9	10%
3.	Report	Week 11	10%
4.	Practical Exam	Week 14	20%
5.	Final Exam	Week 15	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	Martinez Arias, Alfonso. Molecular principles of animal development. 1st Ed., Oxford University Press,2002

Supportive References	Martinez Arias, Alfonso. Molecular principles of animal development. 1st Ed., Oxford University Press,2002
Electronic Materials	**www.ncbi.nlm.nih.gov**
Other Learning Materials	**Models for embryogenesis**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Lecture room with 30 seats.**
Technology equipment (projector, smart board, software)	**Projector, Smart Board, MATLAB**
Other equipment (depending on the nature of the specialty)	**Models for embryogenesis**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Peer Review, Students**	**Direct, Indirect**
Effectiveness of Students assessment	**Students**	**Indirect**
Quality of learning resources	**Students**	**Indirect**
The extent to which CLOs have been achieved	**Students**	**Indirect**
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DEPARTMENT COUNCIL**
REFERENCE NO.	**4**
DATE	**5/11/2023**

قسم التقنية الحيوية بكلية العلوم
Biotechnology Department
TU جامعة الطائف TAIF UNIVERSITY