هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	**Introduction to Genetic Engineering**
Course Code:	**2053103-3**
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:					
5th Level/ 3rd Year					
4. Course general Description:					
The aim of this course is to introduce the students to the principles and techniques employed in genetic engineering and recombinant DNA technology. It covers the following topics: use of restriction enzymes in biotechnology, DNA modifying enzymes, vectors, basic concept of recombinant DNA technology, gene isolation and modifications, gene libraries, methods of gene transfer, DNA sequencing, blotting techniques, detections of transgenes, biosafety of GMOs.					
5. Pre-requirements for this course (if any)**:**					
2052204-3, Molecular Genetics					
6. Co-requirements for this course (if any)**:**					
Not Applicable					
7. Course Main Objective(s):					
The objective of this course is to identify the basic principles of techniques employed in genetic engineering and recombinant DNA technology and to recognize the use of modern tools and techniques for manipulation of genomic sequences.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
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	Describe the principles of genetic engineering	K2	Lecture	Written Exams
1.2	State the various applications of genetic engineering and transgenic organisms	K2	Lecture	Written Exams
1.3	Outline the ethics and regulations of Genetic Engineering	K4	Lecture & Discussion	Written Exams
2.0	**Skills**			
2.1	Evaluate the different applications of DNA modifying enzymes, vector types, host genotype specificities for selection and screening of recombinant transformants.	S1	Lecture	Written Practical Exam
2.2	Practice molecular methods for producing transgenic organisms	S1	Project	Report
3.0	**Values, autonomy, and responsibility**			
3.1	Present the academic and professional morals	V1	Group Discussion	Performance Evaluation

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction	2
2.	Tools and techniques, I	4
3.	Tools and techniques II	4
4.	Introduction to cloning	3
5.	Labelling and detection of nucleic acid sequences	3
6.	Genomic DNA libraries	3
7.	DNA sequencing	3
8.	In-silico analysis	3
9.	Applications of genetic engineering	2
10.	Genetic Engineering Biosafety and regulations	3
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, Performance evaluation.	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	M. Wink. An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications inModern Biotechnology (Wiley, ed. 2, 2011). 3. K. Wilson, J. Walker. Principles and Techniques of Biochemistry and Molecular Biology (Cambridge University n Press, ed. 7, 2010).
Supportive References	Text Book: 1. M. R. Green, J. Sambrook. Molecular Cloning: A Laboratory Manual (Cold Spring Harbor, ed. 4, 2012).
Electronic Materials	NBCI website (https://www.ncbi.nlm.nih.gov)
Other Learning Materials	Software for genetic analysis simulations.

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)	**Data show, genomic analysis software, internet connection**.
Other equipment (depending on the nature of the specialty)	**Thermal cycler, Gel documentation system**

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 (survey)
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**

قسم التقنية الحيوية بكلية العلوم
Biotechnology Department
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