



Course Specifications

Course Title:	Molecular Pharming and Biotechnology
Course Code:	2054106-3
Program:	Biotechnology
Department:	Biotechnology
College:	Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3 (2 Lecture, 1 Lab)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 11th Level/ 4th Year
4. Pre-requisites for this course (if any): 2053103-3, Introduction to Genetic Engineering
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	60	%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

Molecular pharming means the use of whole organism, organ, tissue or cells to produce therapeutic substances. The creation of genetically modified organisms (GMOs) is having a major impact on biotechnology. This course will cover the difference between molecular pharming and molecular farming, the importance of molecular pharming, methods used in the production of animal and plant bioreactors, models of animal and plant bioreactors, design of bioreactors and expression systems, up- and down-stream processing, and the commercial and environmental concerns of GMO technology.

2. Course Main Objective

The objective of this course is to recognize the principle concepts of molecular pharming, differences between molecular pharming and molecular farming, up- and down- stream processes in pharming, and construction of genetically modified organism model.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Define the molecular pharming and its economic and environmental impacts.	K1
1.2	Describe the different types of bioreactors design and processing	K4
2	Skills :	
2.1	Design upstream process for recombinant production.	S.2
2.2	Differentiate between different types of bioreactors	S.2
3	Values:	
3.1	Adapt to different communication and instruction technologies	V.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to molecular pharming and its economic and environmental impacts.	2
2	The difference between molecular pharming and molecular farming	2
3	Upstream constructions	4
4	Downstream processing	4
5	Bioreactors	4
6	Microbial bioreactors	4
7	Plant bioreactors	2
8	Animal bioreactors	4
9	Purification of recombinant products	4
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	Define the molecular pharming and its economic and environmental impacts.	Lecture	Written Exam
1.2	Describe the different types of bioreactors design and processing	Lecture	Written Exam
2.0	Skills		
2.1	Design upstream process for recombinant production.	Project	Report
2.2	Differentiate between different types of bioreactors	Lecture	Written exam (Practical)
3.0	Values		
3.1	Adapt to different communication and instruction technologies	Discussion	Oral exam and Performance evaluations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	Week 4	20%
2	Periodical exam	Week 7	10%
3	Project	Week 8	10%
4	Practical Exam	Continues	20%
5	Final Exam	Week 11	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 :

6 hours per week of office hours are available for each faculty members for consultations and academic advice.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	-Shimasaki, C. (2014). <i>Biotechnology Entrepreneurship (1st Edition): Starting, Managing, and Leading Biotech Companies</i> . Academic Press. Pages: 488. - Atrill, P. and McLaney, E. (2002). <i>Financial Accounting for Non Specialists, 3rded</i> , FT/Prentice Hall, Harlow.
Essential References Materials	Journals, Reports, etc.
Electronic Materials	Web Sites, Facebook, Twitter, etc.
Other Learning Materials	such as computer-based programs/CD, professional standards or regulations and software.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	One classroom with internet connection for 2 hours a week .
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show and Smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course management and planning	Students	Indirect
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Students	Indirect
Effectiveness of Evaluation and exams	Students, Peer Reviewer	Indirect, Direct

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
Reference No.	7
Date	16-6-1443

