Course Description Form

1. Course Name:
Biotechnologies
2. Course Code:
BIOT413
3. Semester / Year:
First fall semester 2024-2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
My presence+ONLINE
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoretical 2 + 3 practical/3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Assistant Prof. Dr. Esraa Abd-al huseein Jasim Email:- Esraa.AJ@uomosul.edu.iq M. Maab Muhammad Othman Email:- M. Zohoor fuad
8. Course Objectives
The course aims to teach students about the basic principles of the concept **Biotechnology, its uses and applications in production**

Agricultural technology and its techniques used in breeding and improving plants and how

Producing genetically modified plants and using genetic fingerprinting technology

In plant breeding and improvement and in genetic diversity, recognition

On the concept of biotechnology, the devices used in it,

The use of genetic fingerprinting in the field of plant breeding and improvement,

Creating genetically modified plants and using technology Gene gun.

9. Teaching and Learning Strategies

- Interactive lecture

- Brainstorming

- Dialogue and discussion

- Assigning tasks and reporting

- Presentations of scientific films about plant genetics

Meiosis and the nature of chromosomes

- He is assigned to prepare a report entitled from his diligence

He prepares it for discussion with students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	• 2Theoretical	A1: Identify the inputs and outputs of biotechnology	Provided input Outputs and applications Biotechnologies	Audio methods, writing style on Blackboard dialogue style Live Power point slides	Short exams, assignments, discussions
	• 3 practical	A2: The student gets to know the devices	Identify devices Used in	Interactive lecture Dialogue and	Short exams Assignment of

			laboratory Biotechnologies	discussion Practical Training Self-education	duty discussions
2	• 2Theoretical	C3: The student masters the benefits of applications of technologies Vitalityin heritance	Benefits of biotechnology	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	A1: The student gets to know the devices	Identify devices Used in laboratory Biotechnologies	Interactive lecture Dialogue and discussion Practical Training Self education	Short exams Assignment of duty discussions
3	• 2Theoretical	C3: The student can distinguish between Plant cell and what it is Its parts.	Plant Cell	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	C4: Prepare solutions Different percentages And molarity and molality And standard	Methods of preparing solutions And types of buffer solutions Which is used in a laboratory Biotechnologies	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussions
4	• 2Theoretical	A2: He knows parts Cell and contents Protoplast.	Parts of a plant cell	Audio methods, writing style on Black board dialogue	Short exams, assignments, discussions

				style Live Power point slides, movies Scientific	
	• 3 practical	A2: He has the knowledge How to extract The DNA	Extraction protocol DNA	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty Discussions
5	• 2Theoretic	B1: The student is able to identify acids Nuclear and its presence in Organisms	Nucleic acids	Audio methods, writing style on Blackboard dialogue styleLive Power Points lides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	C1: Protocol application DNA extraction	Extraction protocol DNA from animal sources	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussions
6	•2Theoretic	A2: He knows the genes And recognize the concept Genes.	Genes (inheritance)	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions

	• 3 practical	B1: Student knowledge Extraction protocol The DNA	Extraction protocol DNA using a ready-made extraction kit	Interactive lecture Dialogueand discussi on Practical Training Self-education	Short exams Assignment of duty discussions
7	• 2Theoretical	A1: identify The genetic code and learning how to read it And deduced by Genetic implications.	Genetic code	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	C4: identify Extraction protocol DNA from pea plants	Extraction protocol DNA from pea plants	Interactive lecture Dialogue and discussion Practical Training Self education	Short exams Assignment of duty discussions
8	• 2Theoretical	D3: Explains the concept of gene cloning and technology PCR and multiplexing Genetic material.	Gin clona (Gene cloning) and technology PCR	Audio methods, writing style on Blackboard dialogue style LivePowerpoint slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	D1:Acquire skills In preparin DNA from Bacteria cells	Protocol for preparing (extracting) plasmid DNA from bacterial cells	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussionس

9	• 2Theoretical	B2: Explains how Plant cell and tissue culture and how The use of biotechnology in this field.	Cultivation of plant cells, tissues and organs	Audio methods, writing style on Blackboard dialogue style Live Power pointslides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	E1: Contributes to recognition On protocol extraction RNA from eukaryotic cells	Extraction protocol RNA from real cells Nucleus	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussions
10	• 2Theoretical	A1: Learn about how callus is created and grows.	Callus formation and growth	Audio methods, writing style on Blackboard dialogue style Live Power point slides,movies Scientific	Short exams, assignments, discussions
	• 3 practical	C3: He uses what he needs What information is available He has mastered his work	Extraction protocol DNA from the thymus gland Calf	Interactive lecture Dialogue and discussion Practical Training Self education	Short exams Assignment of duty Discussions
11	• 2Theoretical	B5: Distinguish and know the methods of culture of suspension cells How these farms were created	Suspension cell culture	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	D1:Acquire skillsIn stimating the number of moles Cytosine and quinine	Estimating the number of moles of cytosine and quinine and the degree of dissolution	Interactive lecture Dialogue and discussion Practical Training	Short exams Assignment of duty

				Self-education	discussions
12	• 2Theoretical	D3: Shows a method Protoplast isolation and cultivation by biotechnology and somatic hybridization	Protoplast isolation Its cultivation and hybridization process Somatic	Audio methods, writing style on Blackboard dialogue style Live Power point slides,Movies Scientific	Short exams, assignments, discussions
	• 3 practical	E1: Performs quantitative estimation To concentrate the DNA	Quantitative estimation of the concentration of... DNA	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussions
13	• 2Theoretical	A1: identify Genetically modified plants and the possibility of transferring genes between plant species and varieties.	Transgenic plants the plant	Audio methods, writing style on Blackboard dialogue style Live Power point slides, movies Scientific	Short exams, assignments, discussions
	• 3 practical	B1: He has the knowledge In creating plants Transgenic	Creating modified plants Hereditary	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussion
14	• 2Theoretical	C5: Runs loops Discussion regarding student training. Extraction DNA.	Discussion panels And reports on technologies Vitality	Audio methods, writing style on Blackboard dialogue style LivePowerpoint slides, movies	Short exams, assignments, discussions

				Scientific	
	• 3 practical	C5: Runs loops Discussion regarding student training.Extraction DNA.	Discussion panels And reports on technologies Vitality	Interactive lecture Dialogue and discussion Practical Training Self-education	Short exams Assignment of duty discussions
15	• 2Theoretica	C3: A field visit In thetechnology laboratory Vitality and how DNA extraction	Solving a problem, field visit to a biotechnology laboratory.		Short exams, assignments, discussions
	• 3 practical	C3: A field visit In thetechnology laboratory Vitality and how DNA extraction	Solving a problem, field visit to a biotechnology laboratory		Short exams Assignment of duty discussions

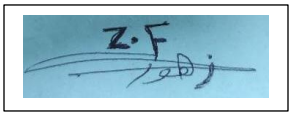
11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Principles of Biotechnology (written by Dr. Kamal Benjamin Isho) 2020 Jordan Edition (theoretical and practical)
Main references (sources)	1-Biotechnology 2- Gene technology and practical exercises 3- Practical techniques in genetic fingerprinting Technology in fingerprinte

Recommended books and references (scientific journals, reports...)	engineering 1-genetic 2-Methods in biotechnology 3-In vitro culture of higher plants
Electronic References, Websites	In addition to the World Wide Web International university websites regarding films Scientific knowledge in the field of biotechnology



Theoretical lecturer

Assistant Prof. Dr. Esraa Abd-al huseein Jasim

Practical lecturer

ASSIT. LECTURER ZOHOR FOAD

ASSIT. LECTURER MAAB MOHAMMED OTHMAN

Chairman of the Scientific Committee

Prof. Dr. Jassim Mohammed Alwan

Head of the department

Prof. Dr. Asmaa Muhammad Adel