Course Description Form

1. Course Name:

Genetic Engineering

2. Course Code:

GEEN371

3. Semester / Year:

Second semester (Spring) / 2024-2025

4. Description Preparation Date:

1/2/2025

5. Available Attendance Forms:

Presence + elictronical

6. Number of Credit Hours (Total) / Number of Units (Total)

2 theoretical hours + 3 practical hours (75 hours) / 3.5 units

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Tariq Zaid Ibrahim
Dr. Hala Abdul-Hadee Salih

8. Course Objectives

Theoretical	Practical
- Enabling the student to understand and understand what is related to genetic engineering and its relationship to the food industry - Enabling the student to learn about the most important applications of genetic engineering in the field of food science - Making the student familiar with the most important methods of cloning the desired genetic genes - Making the student familiar with the most important vectors of genetic engineering - Enabling the student to understand and realize enzymes related to genetic engineering - Making the student familiarize himself with the most important classifications of restriction enzymes and their uses in the field of genetic engineering	- Enabling the student to work collaboratively to discover leadership skills - Enabling the student to identify the most important methods of preparing samples for DNA isolation - To familiarize the student with the most important methods of DNA isolation - To familiarize the student with the most important methods of separating cellular DNA - The student should know the mechanism for determining sequences on the DNA strand

9. Teaching and Learning Strategies

Theoretical	Practical
- Interactive lecture - Brainstorming - Dialogue and discussion - Assigning reports -Conducting monthly and daily examinations	- Assigning group work to reveal leadership skills - Assigning tasks and reporting for each experiment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** The concept of genetic engineering and its areas of interest **PRACTICAL** Preparing samples to extract DNA from more than one sample	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
2	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** A general review of the topics of reproduction and translation **PRACTICAL** DNA extraction and methods for eliminating RNA and protein	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
3	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** Gene expression and ways to control it **PRACTICAL** DNA separation by electrophoresis	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
4	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Restriction enzymes **PRACTICAL** Electrophoresis in a pulsed field	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
5	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests	**theoretical** Draw a constraint map **PRACTICAL**	**THEORETICAL** audio methods, Writing on the board	Shortexams, assignments, discussions

		in the development of food science **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	Gradient scanning electrophoresis	Direct dialogue style **PRACTICAL** Assigning tasks and reports	
6	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** Genetic engineering vectors (plasmids) **PRACTICAL** Detection of DNA fragments marked with radioactive materials	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
7	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** Other genetic engineering vectors (viruses, cosmids, and vismids) **PRACTICAL** Plasmid DNA isolation	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
8	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Gene expression vectors **PRACTICAL** Plasmid DNA purification	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
9	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Gene library and selecting the desired gene **PRACTICAL** PCR technology	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
10	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL**	**THEORETICAL** Gene library and selecting the desired gene **PRACTICAL**	**THEORETICAL** audio methods, Writing on the board Direct dialogue style	Shortexams, assignments, discussions

		b1 distinguishes the student methods of investigating the genetic material of cells and its forms	PCR applications	**PRACTICAL** Assigning tasks and reports	
11	2Theoretical 3Practical	**THEORETICAL** a2 The student learns about genetic engineering vectors, their enzymes and their technologies **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** Transfer of cloned DNA to recipient cells **PRACTICAL** Determine the sequences of nitrogenous bases	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
12	2Theoretical 3Practical	**THEORETICAL** b2The student judges the transformed cells and their acquisition of new genetic characteristics **PRACTICAL** c1 The student examines different samples to extract the genetic material of the cells	**THEORETICAL** Detection of transformed cells **PRACTICAL** Determine the sequences of nitrogenous bases	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
13	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Genetically engineering plants **PRACTICAL** Bioinformatics	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
14	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Genetically engineering bacteria **PRACTICAL** Bioinformatics and genetic engineering applications	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
15	2Theoretical 3Practical	**THEORETICAL** a1 The student is introduced to the concept of genetic engineering and its interests in the development of food science **PRACTICAL** b1 distinguishes the student methods of investigating the genetic material of cells and its forms	**THEORETICAL** Gene manipulation and the controversy surrounding genetic engineering **PRACTICAL**	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions

			Use of gene bank		

11. Course Evaluation

t	Evaluation methods	Evaluation date (one week)	Grade	Relative weight %
1	Final theoretical report + theoretical practical reports	Theoretical 15 weeks Practical 1-15 weeks	7theoretical + 6 practical	13%
2	Short test 1 Quiz	3 weeks	4theoretical + 2practical	6%
3	Midterm exam (theoretical and practical)	9 weeks	10theoretical + 5 practical	15%
4	Short test 2 Quiz	12 weeks	4 theoretical + 2 practical	6%
5	Final practical test	practical exams week	20	20%
6	Final theoretical exam	theoretical exams week	40	40%
			100	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Genetic engineering written by Dr. Hamza Ghaleb Al-Bakri - University of Baghdad
Main references (sources)	Genetic engineering written by Dr. Abdul Hussein Al-Faisal
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Gene Bank

Course administrator's name : Dr. Tariq Zaid Ibrahim

lab. Dr. Hala Abdul-Hadee Salih

Head of Scientific council : Assi. Prof. Dr. Taha M. Taqi

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