Course Description Form

1. Course Name:	
Genetic Engineering	
2. Course Code:	
GEEN371	
3. Semester / Year:	
Second semester (Spring) / 2023-2024	
4. Description Preparation Date:	
1/2/2024	
5. Available Attendance Forms:	
Presence	
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	
8. Course Objectives	
Theoretical - 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	Practical - 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 - Interactive lecture - Brainstorming - Dialogue and discussion - Assigning reports -Conducting monthly and daily examinations	Practical - 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 learns about the concept of genetic engineering and its areas of interest **PRACTICAL** b3 The student examines different samples to extract DNA	**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** c1 The student explains the concept of reproduction and translation **PRACTICAL** b4 The student discovers which methods are appropriate for extracting DNA from cell suspensions	**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** a2The student is familiar with the process of gene expression and ways to control it **PRACTICAL** a10The student identifies DNA separation factors using electrophoresis	**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** b1 The student judges the enzymes and their uses **PRACTICAL** a11The student determines DNA	**THEORETICAL** Restriction enzymes **PRACTICAL** Electrophoresis in a pulsed field	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks	Shortexams, assignments, discussions

		separation factors using pulsed field electrophoresis		and reports	
5	2Theoretical 3Practical	**THEORETICAL** c2The student masters the methods of drawing a constraint map **PRACTICAL** a12The student determines the factors for separating DNA using the gradient scanning electrophoresis method	**theoretical** Draw a constraint map **PRACTICAL** Gradient scanning electrophoresis	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
6	2Theoretical 3Practical	**THEORETICAL** a3 The student learns about the most important genetic engineering vectors (plasmids) **PRACTICAL** b5 The student distinguishes methods for detecting DNA fragments marked with radioactive materials	**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** a4The student learns about the most important genetic engineering vectors (viruses, cosmids, and vismids) **PRACTICAL** b6The student distinguishes methods for isolating plasmid DNA	**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** c3 The student explains the most	**THEORETICAL** Gene expression vectors	**THEORETICAL** audio methods, Writing on the	Shortexams, assignments, discussions

		important gene expression vectors and their products **PRACTICAL** b7 The student reveals the most important methods of purifying plasmid DNA	**PRACTICAL** Plasmid DNA purification	board Direct dialogue style **PRACTICAL** Assigning tasks and reports	
9	2Theoretical 3Practical	**THEORETICAL** a5 The student will be familiar with the most important ways to benefit from the gene library **PRACTICAL** b8The student distinguishes the details of the polymerase chain reaction method	**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** a6 The student is familiar with the most important ways to benefit from the gene library **PRACTICAL** b9 The student discovers the most important applications of polymerase chain reaction	**THEORETICAL** Gene library and selecting the desired gene **PRACTICAL** PCR applications	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions
11	2Theoretical 3Practical	**THEORETICAL** a7 The student learns about methods of transferring DNA to recipient cells **PRACTICAL** c4The student tests methods for determining sequences of nitrogenous bases	**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	**THEORETICAL** Detection of	**THEORETICAL** audio methods,	Shortexams, assignments,

		judges the transformed cells and their acquisition of new genetic characteristics **PRACTICAL** c5 The student tests methods for determining sequences of nitrogenous bases	transformed cells **PRACTICAL** Determine the sequences of nitrogenous bases	Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	discussions
13	2Theoretical 3Practical	**THEORETICAL** a8 The student learns about methods of genetically engineering plants **PRACTICAL** c6 The student experiences the use of Bioinformatics	**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** a9 The student learns about methods of genetically engineering bacteria **PRACTICAL** c7 The student experiences the use of Bioinformatics	**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** e1 The student appreciates the ethics of genetic manipulation **PRACTICAL** c8 The student tries to use the gene bank to determine lineages	**THEORETICAL** Gene manipulation and the controversy surrounding genetic engineering **PRACTICAL** Use of gene bank	**THEORETICAL** audio methods, Writing on the board Direct dialogue style **PRACTICAL** Assigning tasks and reports	Shortexams, assignments, discussions

11. Course Evaluation

t	Evaluation methods	Evaluation date (one	Grade	Relative

		week)		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

Instructor of theoritical part

Dr. Tariq Zaid Ibrahim

Instructor of practical part

Chairman of the scientific committee

Prof. Dr. Moafak mahmood ahmed

Head of the department of Food science

Prof. Dr. Sumaya khalaf badawi