Course Description Form

1. Course Name:	
Biotechnology 2	
2. Course Code:	
BIOTE472	
3. Semester / Year:	
First semester (fall) / 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 Nowaf Khalil and Enas Mounir Abdel Majeed	
8. Course Objectives	
Theoretical: The student learns about production methods an compounds that can be produced by industrial microorganisms - Methods of fixing cells and free and bound cells	practical : Introducing the student to the important life applications of biotechnology Enabling the student to use simple raw materials operations Productivity Crystallizing new ideas regarding the use of microscopic organisms It has become possible and an alternative to productive factories that serve Sustainable development goals if exploited prope Production of many important materials in the fo industry Pharmaceutical and cosmetic laboratory
9. Teaching and Learning Strategies	
Theoretical - Interactive lecture - Brainstorming - Dialogue and discussion - Assigning reports -Conducting monthly and daily examinations	Practical Interactive lecture -Discussion, dialogue, brainstorming -Conducting laboratory experiments -Assigning reports -Conducting daily and monthly examinations

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical 3Practical	Theoretical : a1 The student learns abou methods for produc bread yeast and its types, such as dry, active, and soft yeas Practical a1 The student recognizes Technica aware Biotechnolog in the field of enzym industry	Theoretical: Production of bread yeast practical Enzyme production	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
2	2Theoretical 3Practical	Theoretical : b1 The student learns abou the types of organic acids, their importance, the type of producing microorganisms, an production methods Practical : b1 The student is able estimate the purity enzymes	Theoretical: Production of organ acids practical Enzyme production	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
3	2Theoretical 3Practical	Theoretical : a2 The student learns abou the types of amino acids, their importance, the type of producing microorganisms, an production methods Practical : b2 The student masters methods of produc amino acids and sin cell protein	Theoretical: Production of amino acids Practical : Product of amino acids a single cell protein	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
4	2Theoretical 3Practical	Theoretical : c1 The student learns abou the types of artificia microbial vaccines a production methods the vaccine	Theoretical: prepari the vaccine Practical : Biomass production from Multiple carbo sources	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL	Shortexams, assignments, discussions

		practical : B3 The student gets to know different types of Carbon sources		Assigning tasks and reports	
5	2Theoretical 3Practical	Theoretical : a3 The student learns about the types of vitamins Its importance and types of living things Microstructure produced And production methods Practical : A2 The student can Produce biomass By Using bread yeast	Theoretical: Vitamin production practical Effect of carbon Source On biomass production	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
6	2Theoretical 3Practical	Theoretical : d1 The student learns about the types of alcohol used for industrial a therapeutic purpose their importance, th types of microorganisms produced, and production methods Practical : b4, c1 The student looks at modern techniques In bio production Through visits Field	Theoretical: Industr alcohol production practical Field visits project	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
7	2Theoretical 3Practical	Theoretical : c2 The student learns about the types of enzyme Industrial, its importance and type Microbiology Producers and production methods Practical : e1 The student gets to know Types of fermentations Producing lactic acid	Theoretical: Enzyme production practical Lactic acid fermentations	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 learns abou the types of industri enzymes, how to estimate their effectiveness, and th mechanism of their contribution as cofactors in biologic reactions. Practical : b5 The student can Use of farms immersed in production Lactic acid	Theoretical: Estimating enzymes and measuring their effectiveness practical Lactic a fermentations	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
9	2Theoretical 3Practical	Theoretical : a3 The student learns abou the types of antibiot used for industrial a therapeutic purpose their importance, th types of microorganisms produced, and production methods Practical : b5 The student can Conduct an experiment Restriction through Adsorption process	Theoretical: Antibio production practical Restriction of cells a enzymes	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
10	2Theoretical 3Practical	Theoretical : a4 The student learns the definition of restriction (fixation) the mechanism and methods of fixation, and the difference between free and restricted cells in production efficienc Practical : b6 The student lea about the stages citric acid productio	Theoretical: Free an fixed cells and enzymes practical Citric acidfermentations	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions

11	2Theoretical 3Practical	Theoretical : d2 The student learns abou sedimentation methods and appropriate solvent for separating biotechnology products Practical : b7 The student can Of sour separation Citric from the midd Production	Theoretical: Method of precipitation and purification of biotechnology products practical Citric a fermentations	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
12	2Theoretical 3Practical	Theoretical : d3 The student learns abou methods for estimating products such as colorimetric methods and chromatography And spectroscopic Practical : b8 The student can produce Cellulase enzyme Solidstate fermentations	Theoretical: Estimating the outcomes of biotechnology practical Solidstate fermentations	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
13	2Theoretical 3Practical	Theoretical : a5 The student learns abou the effect of the type and concentration o carbon and nitrogen sources and the presence of some catalysts and vitami within the composition of the nutritional medium Production efficien Biotechnology products Practical : a3 The student gets to know Produced objects For antibiotics	Theoretical: Studyin the effect of growth factors on industrial microorganisms practical Isolation of a productive microorganism For antibiotics	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions

14	2Theoretical 3Practical	Theoretical : d4 The information present in previous lectures reviewed Practical : a4 The student is able to produce and classify counterfactuals Penicillin by Biomanufacturing	Theoretical: a comprehensive Review practical Production penicillin antibiotic	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
15	3 practical	Theoretical: d5 The student masters the information related previous lectures practical Full review practical Full review	Theoretical: a comprehensive revi Course review Practical Course review	Practical Oral questions (competition) practical experiences, Short test questio	discussions

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)	Biotechnology book (Dr. Fayez Al-Ani), Biotechnology book Dr. Khafaji flower
Main references (sources)	(Sources) Biotechnology Book (Dr. Fayez Al-Ani)
Recommended books and references (scientific journals, reports…)	references (scientific journals, reports....)
Electronic References, Websites	Electronic references, Internet sites, Research gat

Instructor of theoritical part	Instructor of practical part
Dr. Tariq nawaf khalil	Enas Mounir Abdel Majeed
Chairman of the scientific committee	Head of the department of Food science
Prof. Dr. Moafak mahmood ahmed	Prof. Dr. Sumaya khalaf badawi