

الملحق (2): دليل البرنامج الدراسي

دليل البرنامج الدراسي (2026-2025) Program Catalogue

Northern Technical University

Phase I - Bachelor's Degree (B.Sc.) – Department of Biotechnology and Food Science



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1.Mission & Vision Statement

Vision Statement

To be a leading academic and research hub in biotechnology and food sciences, advancing innovation, sustainability, and global food security through cutting-edge education, scientific excellence, and industry collaboration.

Mission Statement

Provide high-quality education and training that prepare graduates with the knowledge, skills, and ethics to excel in biotechnology and food sciences •Foster innovative research that addresses challenges in health, agriculture, and food security while promoting sustainable solutions•Collaborate with industry, government, and communities to translate scientific discoveries into practical applications that improve quality of life •Cultivate critical thinking, creativity, and leadership among students to contribute to national and global scientific advancement.

2.Program Specification

Program me code:	BFS	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Department of Biotechnology and Food Sciences is one of the pioneering academic departments that integrates fundamental sciences with modern technological applications. Its mission is to prepare highly qualified scientific cadres with advanced knowledge and practical skills in the fields of biotechnology and food sciences, in alignment with the requirements of the labor market and the principles of sustainable development.

The department adopts a comprehensive academic program structured across four academic levels, progressing from fundamental foundations to advanced professional and research competencies.

First Level: Foundational Stage

This stage provides students with the essential scientific knowledge that forms the cornerstone for further specialization. Courses include General Biology, General Chemistry, Physics, Mathematics and Statistics, English Language, in addition to introductory modules in Food Sciences and Biotechnology. Practical training in specialized laboratories equips students with basic laboratory techniques, safe handling of equipment, and the principles of scientific experimentation.

Second Level: Applied Fundamentals Stage

At this level, students are introduced to more specialized subjects, including Microbiology, Organic Chemistry, Biochemistry, and Basic Biotechnology, along with introductory courses in Food Sciences. Intensive laboratory sessions in microbiological and chemical analysis of food support the theoretical knowledge gained.

Students are also introduced to scientific research methodology, focusing on experimental design, implementation, and data analysis.

Third Level: Specialization Stage

This stage emphasizes advanced specialization through courses such as Genetic Engineering, Agricultural and Industrial Biotechnology, Food Processing Technology, and Quality Assurance. Students are trained in advanced statistical analysis, quality control methods, and experimental research projects that develop their critical thinking and problem-solving abilities. The integration of theory and practice during this stage builds a strong scientific and professional identity.

Fourth Level: Integration and Professional Qualification Stage

As the culmination of the academic journey, this stage includes advanced courses such as Food Safety and Quality, Medical and Environmental Biotechnology, Functional Foods, and Nanotechnology Applications in Food Sciences. Students are engaged in field training across health, agricultural, industrial, and research institutions. In addition, they are required to complete a graduation research project, demonstrating their ability to apply knowledge and skills to real-world scientific challenges.

Graduates of the department possess strong scientific and practical skills that qualify them to work in research centres, health and food laboratories, and the pharmaceutical and food industries..

Thus, the Department of Biotechnology and Food Sciences plays a vital role in supplying the labor market with specialized expertise, supporting food and health security, and contributing to scientific research and industrial development in line with national and regional development goals.

3.Program Objectives

1. Provide a solid scientific foundation in biotechnology and food sciences by integrating fundamental knowledge with modern technological applications.
2. Develop students' practical and technical skills through hands-on training in specialized laboratories and field-based experiences, enabling them to apply scientific principles effectively.
3. Promote research and innovation in biotechnology and food sciences by encouraging students to engage in scientific projects that address current challenges in health, agriculture, industry, and food security.
4. Prepare qualified graduates capable of meeting the demands of the labor market in governmental institutions, research centers, food industries, pharmaceutical companies, and quality control agencies.
5. Strengthen problem-solving and critical-thinking abilities in students, enabling them to design, analyze, and evaluate biotechnological and food-related processes with creativity and innovation.
6. Ensure commitment to professional ethics and safety standards, particularly in laboratory work, food production, and biotechnology applications, in line with international quality and safety requirements.
7. Contribute to sustainable development by preparing graduates who can play an active role in advancing food safety, public health, and environmental protection.

4.Student Learning Outcomes

Student learning outcomes are the final results that the student is expected to achieve after completing the course or course, and represent the knowledge, skills, skills and competencies that he acquires. They are often

formulated and measurable. Here is a model for the student's learning outcomes in general (can be adapted by specialization):

1. Knowledge (Knowledge) Understanding the theoretical foundations and scientific concepts related to the academic field. Familiarity with modern principles and methods of specialization. Learn about the laws, regulations, and ethics related to the field.
2. Skills Applying theoretical knowledge in solving practical problems. Use of modern techniques and tools efficiently in the specialty. Develop scientific research skills, analysis, and conclusion. Mastering written and oral communication skills in both Arabic and English.
3. Competences (Competences) Working in a multidisciplinary team with leadership and cooperative spirit. Commitment to professional ethics and scientific integrity. The ability to continuously learn and adapt to scientific and technical developments. Possess a spirit of initiative and creativity and innovation.

5.Academic Staff

Dr.Maha A.M Al-Jawadi , Head Of Department (Biotechnology and Food Sciences) Ph.D. in Food Science | Teaching

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6.Credits, Grading and GPA

Credits

The Department of Biotechnology and Food Science at the College of Agricultural Technology in Mosul, Northern Technical University, follows the Bologna Process through the European Credit Transfer System (ECTS). The total number of credit hours for programs taught under the European Credit Transfer System is 240, or 30 European credits per semester. One European credit is equivalent to 25 hours of student work, including both structured and unstructured coursework.

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME			
Group	Grade	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C – Good	70 - 79	Sound work with notable errors
	D – Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required
Note:			
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.			

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [(1st\ module\ score \times ECTS) + (2nd\ module\ score \times ECTS) +] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU100	Democracy and Human Rights	33	17	2.00	B	
NTU101	English language	33	17	2.00	B	
TAMO100	General Chemistry	78	72	6.00	B	
BFS100	Agricultural Production Mechanization Techniques	78	72	6.00	C	
BFS101	Laboratory techniques	78	97	7.00	C	
BFS102	Principles of Microbiology	78	97	7.00	C	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU102	Computer	48	27	3.00	B	
NTU103	Arabic language	33	17	2.00	B	
BFS103	Principles of animal production	78	47	5.00	C	
BFS104	Food Laboratory Engineering	78	122	8.00	C	
BFS105	Physical Chemistry	78	97	7.00	C	
TAMO101	Occupational safety	33	17	2.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU200	Crimes of the baath regime in iraq	33	17	2.00	B	
NTU201	English language	33	17	2.00	B	
TAMO200	Biochemistry	78	72	6.00	B	
BFS 200	Building entrepreneurial capabilities	78	72	6.00	C	
BFS 201	Molecular Biology	78	97	7.00	C	
BFS 202	Food Industries	78	97	7.00	C	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
NTU202	agricultural statistics	33	42	3.00	B	
BFS 203	Biotechnical	33	17	2.00	C	
BFS 203	Food Safety and Hygiene	78	72	6.00	B	
BFS 204	Genetically modified foods	78	72	6.00	C	
BFS 205	food poisoning	78	97	7.00	C	
BFS 206	Food Analysis	78	72	6.00	C	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
TAMO300	Dairy Chemistry	78	72	6.00	C	
BFS300	Dairy Processing Techniques	78	72	6.00	C	
BFS301	Food Quality Control	78	72	6.00	C	
BFS302	Food Biology	78	72	6.00	C	
BFS303	Automation of food factory management	78	72	6.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
TAMO301	Circular Economy	78	72	6.00	C	
BFS304	Food Chemistry	78	72	6.00	C	
BFS305	food chain	78	72	6.00	C	
BFS306	Therapeutic Nutrition	78	72	6.00	C	
BFS307	Sugar and Dates	78	72	6.00	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
TAMO400	Butter and Ice Cream	78	72	6.00	C	
BFS400	Meat and Meat Products Technology	78	72	6.00	C	
TAMO401	Labor market skills	78	72	6.00	B	
BFS403	Grain Manufacturing	78	72	6.00	C	
TAMO400	Scientific research methodology	78	72	6.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
BFS408	Project	30	17	6.00	C	
BFS405	Allergy and Food Analysis	78	72	6.00	C	
BFS406	Food Manufacturing and Packaging	78	97	7.00	C	
BFS407	Vegetable Oil Technology	78	122	8.00	C	
BFS106	الامن البايولوجي	35	40	3.00	C	

8.Contact

Dr.Maha A.M Al-Jawadi , Head Of Department (Biotechnology and Food Sciences) Ph.D. in Food Science | Teaching

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Republic of Iraq - Ministry of Higher Education and Scientific Research			جمهورية العراق - وزارة التعليم العالي والبحث العلمي										اسم الجامعة الجامعة القنية الشمالية	بكالوريوس في التقانات الاحيائية وعلوم الاغذية (الدورة الأولى)	أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة	المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤				
Name of University Northern Technical University			اسم الجامعة الجامعة القنية الشمالية										بكالوريوس في التقانات الاحيائية وعلوم الاغذية (الدورة الأولى)	أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة	المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤					
Bachelor's degree in Biotechnology and Food Science (First cycle)			اسم الجامعة الجامعة القنية الشمالية										بكالوريوس في التقانات الاحيائية وعلوم الاغذية (الدورة الأولى)	أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة	المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤					
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr			اسم الجامعة الجامعة القنية الشمالية										بكالوريوس في التقانات الاحيائية وعلوم الاغذية (الدورة الأولى)	أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة	المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤					
Program Curriculum (2023 - 2024)			اسم الجامعة الجامعة القنية الشمالية										بكالوريوس في التقانات الاحيائية وعلوم الاغذية (الدورة الأولى)	أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة	المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤					
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
UGI	One	1	NTU100	Democracy and Human Rights	الديمقراطية و حقوق الانسان	Arabic	2						3	33	17	50	2.00	B		
		2	NTU101	English language	اللغة الانكليزية	English	2						3	33	17	50	2.00	B		
		3	TAMO100	General Chemistry	كيمياء عامة	Arabic	2		3				3	78	72	150	6.00	B		
		4	BFS100	Agricultural Production Mechanization Techniques	تقنيات ممكنة انتاج زراعي	Arabic	2				3		3	78	72	150	6.00	C		
		5	BFS101	Laboratory techniques	تقنيات مختبرية	Arabic	2				2	1	3	78	97	175	7.00	C		
		6	BFS102	Principles of Microbiology	مبادئ علم الاحياء المجهرية	Arabic	2				2	1	3	78	97	175	7.00	C		
													0	0	0	0.00				
													18	378	372	750	30.00			
	Two	1	NTU102	Computer	الحاسوب	Arabic	1		2					3	48	27	75	3	B	
		2	NTU103	Arabic language	اللغة العربية	Arabic	2							3	33	17	50	2	B	
		3	BFS106	Biosecurity Safety	الامن البيولوجي	Arabic	2				3			3	35	40	75	3	B	
		4	BFS103	Principles of animal production	مبادئ انتاج حيواني	Arabic	2				2	1	3	78	47	125	5	C		
5		BFS104	Food Laboratory Engineering	هندسة معامل الاغذية	Arabic	2				2	1	3	78	122	200	8	C			
6		BFS105	Physical Chemistry	كيمياء فيزيائية	Arabic	2				2	1	3	78	97	175	7	C			
												3	33	17	50	2				
												21	383	367	750	30.00				
UGII	Three	1	NTU200	Crimes of the baath regime in iraq	جرائم نظام البعث في العراق	Arabic	2						3	33	17	50	2.00	B		
		2	NTU201	English language	اللغة الانكليزية	English	2						3	33	17	50	2.00	B		
		3	TAMO200	Biochemistry	كيمياء حيوية	Arabic	2		2		3		3	78	72	150	6.00	S		
		4	BFS 200	Building entrepreneurial capabilities	بناء القدرات الريادية	Arabic	2		3				3	78	72	150	6.00	C		
		5	BFS 201	Molecular Biology	الاحياء الجزيئي	Arabic	2		1		2		3	78	97	175	7.00	C		
		6	BFS 202	Food Industries	صناعات غذائية	Arabic	2		2		1		3	78	97	175	7.00	C		
													18	378	372	750	30.00			
	Four	1	TAMO202	agricultural statistics	احصاء زراعي	Arabic	1		1					3	33	17	50	2.00	B	
		2	NTU203	Biotechnical	التقنية الحيوية	Arabic	2							3	33	42	75	3.00	B	
		3	BFS 204	Food Safety and Hygiene	سلامة وصحة الغذاء	Arabic	2				2		1	3	78	72	150	6.00	B	
		4	BFS 205	Genetically modified foods	الاغذية المعدلة جينياً	Arabic	2		2		1		3	78	72	150	6.00	C		
		5	BFS 206	food poisoning	التسمم الغذائي	Arabic	2				3		3	78	97	175	7.00	C		
6		BFS 207	Food Analysis	تحليل اغذية	Arabic	2				3		3	78	72	150	6.00	C			
												18	378	372	750	30.00				
UGIII	Five	1	BFS300	Dairy Chemistry	كيمياء البان	Arabic	2		2		1		3	78	72	150	6.00	C		
		2	BFS301	Dairy Processing Techniques	تقنيات تصنيع البان	Arabic	2		2		1		3	78	72	150	6.00	C		
		3	BFS302	Food Quality Control	سيطرة نوعية وجودة الغذاء	Arabic	2		3				3	78	72	150	6.00	C		
		4	BFS303	Food Biology	احياء اغذية	Arabic	2		1		2		3	78	72	150	6.00	C		
		5	BFS304	Automation of food factory management	اتمة ادارة معامل اغذية	Arabic	2		2		1		3	78	72	150	6.00	C		
		6											3	78	72	150	6.00	C		
													15	390	360	750	30.00			
	Six	1	BFS305	Circular Economy	الاقتصاد الدوار	Arabic	2				3			3	78	72	150	6.00	B	
		2	BFS306	Food Chemistry	كيمياء اغذية	Arabic	2			2		1		3	78	72	150	6.00	C	
		3	BFS307	food chain	السلسلة الغذائية	Arabic	2				3			3	78	72	150	6.00	C	
		4	BFS308	Therapeutic Nutrition	تغذية علاجية	Arabic	2				3			3	78	72	150	6.00	C	
		5	BFS309	Sugar and Dates	سكر وتمر	Arabic	2				3			3	78	72	150	6.00	C	
6													3	78	72	150	6.00	C		
												15	390	360	750	30.00				
UGIV	Seven	1	BFS400	Butter and Ice Cream	زبد وملجات	Arabic	2		2		1		3	78	72	150	6.00	C		
		2	BFS401	Meat and Meat Products Technology	تكنولوجيا اللحوم ومنتجاتها	Arabic	2			1		2	3	78	72	150	6.00	C		
		3	TAMO401	Labor market skills	مهارات سوق العمل	Arabic	2		2		1		3	78	72	150	6.00	C		
		4	BFS403	grain manufacturing	تصنيع حبوب	Arabic	2			3			3	78	72	150	6.00	B		
		5	TAMO400	Scientific research methodology	منهجية البحث العلمي	Arabic	2			2		1	3	78	72	150	6.00	C		
		6												3	78	72	150	6.00	C	
													15	390	360	750	30.0			
	Eight	1	TAMO401	Graduation Project	مشروع تخرج	Arabic					2			3	30	17	150	6.00	C	
		2	BFS405	Allergy and Food Analysis	تحليل الحساسية والأطعمة الغذائية	Arabic	2			2		1		3	78	72	150	6.00	C	
		3	BFS406	Food Manufacturing and Packaging	تصنيع وتغليف الاغذية	Arabic	2			2		1		3	78	97	175	7.00	C	
		4	BFS407	Vegetable Oil Technology	تقنية الزيوت النباتية	Arabic	2			3			3	78	122	200	8.00	C		
		5	BFS106	Biosecurity Safety	الامن البيولوجي	Arabic	2				3			35	40	75	3.00	C		
6													9	299	348	750	30.0			
												129	2986	2911	6000	240.0				
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												129	2986	2911	6000	240.0				
												129	2986	2911	6000	240.0				
												129	2986	2911	6000	240.0				
												129	2986	2911	6000	240.0				

Northern Technical University الجامعة التقنية الشمالية



First Cycle – Bachelor's degree (B.Sc.) – Biotechnology and Food Science

بكالوريوس – التقانات الاحيائية وعلوم الأغذية



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1. Overview

This catalogue is about the courses (modules) given by the program of Department of Biotechnology and Food Science to gain the Bachelor of technical degree. The program delivers (44) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج التقانات الاحيائية وعلوم الأغذية للحصول على درجة بكالوريوس التقني. يقدم البرنامج (44) مادة دراسية، على سبيل المثال، مع (6000) إجمالي ساعات حمل الطالب و 240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2025-2026

Module 1

Code	Course/Module Title	ECTS	Semester
NTU100	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
Course Description: Democracy and Human Rights			
This course examines the foundational theories, historical evolution, and institutional frameworks of modern democratic systems and universal human rights. Students will explore core democratic principles, civil liberties, the rule of law, and the mechanisms used to protect human rights at both domestic and international levels. Through critical analysis of contemporary case studies, learners will evaluate global challenges facing democratic governance and the ongoing struggle for social justice			

Module 2

Code	Course/Module Title	ECTS	Semester
NTU101	English language	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
<u>What do you learn from English language?</u> The study of English explores fascinating elements of both literature and language. How we communicate, how words and language have developed, and what this means for us and society. Studying English literature and language gives you the tools to analyse the spoken and written word critically and creatively. When first learning English , there are several key things to focus on in order to build a strong foundation for language proficiency . These include learning basic grammar rules , expanding vocabulary , practicing pronunciation , and developing listening and reading comprehension skills .			

Module 3

Code	Course/Module Title	ECTS	Semester
TAMO100	General Chemistry	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
General chemistry A general chemistry course may cover basic topics such as atomic structure, molecular structure, chemical bonding and acids and bases. Students may also learn about biological chemistry, organic chemistry and nuclear chemistry. Chemistry is the science describing matter and its transformations. It is the science that defines molecules, nanostructures, and extended solids, and their properties, reactions and applications. General Chemistry is an introduction to the basic concepts of chemistry, including atomic structure and bonding, chemical reactions, and solutions. Other topics covered include gases, thermodynamics, kinetics and equilibrium, redox, and chemistry of the elements.			

Module 4

Code	Course/Module Title	ECTS	Semester
BFS100	Agricultural Production Mechanization Techniques	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Agricultural Mechanization Production Techniques This course explores the modern machinery, equipment, and automated technologies utilized to optimize crop production and farm management. Students will examine the operation, maintenance, and selection principles of tractors, tillage tools, planting implements, and harvesting systems. Practical applications focus on improving operational efficiency, reducing labor costs, and promoting sustainable engineering practices in modern agriculture.			

Module 5

Code	Course/Module Title	ECTS	Semester
BFS101	Laboratory techniques	7	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Laboratory Techniques This course introduces fundamental laboratory procedures, safety protocols, and essential equipment handling			

used in scientific and medical research. Students gain hands-on experience in preparing solutions, performing accurate measurements, operating microscopes and centrifuges, and maintaining sterile environments. Emphasis is placed on data collection, analytical accuracy, and adherence to standard operating procedures in professional laboratory settings.

Module 6

Code	Course/Module Title	ECTS	Semester
BFS 102	Principles of Microbiology	7	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Advanced Laboratory Techniques This course builds upon fundamental laboratory principles by exploring advanced analytical methods, modern instrumentation, and complex diagnostic procedures. Students will investigate specialized techniques such as chromatography, spectrophotometry, and molecular analysis, focusing on precision, quality control, and troubleshooting. Emphasis is placed on data interpretation, safety compliance, and the application of cutting-edge technology in industrial or clinical research environments.			

Module 7

Code	Course/Module Title	ECTS	Semester
NTU102	Computer	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
Principles of Computing teaches the essential ideas of Computer Science for a zero-prior-experience audience. Computers can appear very complicated, but in reality, computers work within just a few, simple patterns. You'll learn how to use algorithms and abstractions to create programs that solve problems or to express your own creativity. Topics may include: Developing algorithms. Simulations. By a principle, we mean a statement that guides or constrains future action. Computing principles are of two kinds: (1) recurrences, including laws, processes, and methods that describe repeatable cause-effect relationships, and (2) guidelines for conduct.			

Module 8

Code	Course/Module Title	ECTS	Semester
NTU103	Arabic language	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
Choose MSA if your goal is to learn Arabic to read and understand the Quran. MSA or Egyptian Colloquial Arabic are both great options if you want to travel to Arabic countries and be able to speak with locals in their language and dialect. The language is written from right to left. This is difficult both conceptually and technologically — most computer systems were developed for left-to-right languages like English. Letters change shape based on whether they're in the beginning, the middle, or the end of a word.			

Module 9

Code	Course/Module Title	ECTS	Semester
BFS 103	Principles of animal production	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	35	40
Description			
Course Description: Principles of Animal Production This course provides an overview of the fundamental principles of domestic livestock production, including the breeding, feeding, management, and health of major farm animals. Students will examine the economic importance of the livestock industry, basic animal anatomy and physiology, and modern production systems. Emphasis is placed on sustainable management practices, animal welfare, and optimizing productivity in animal agriculture.			

Module 10

Code	Course/Module Title	ECTS	Semester
BFS 104	Food Laboratory Engineering	8	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	122
Description			
Course Description: Food Plant Engineering This course covers the design, operation, and optimization of equipment and systems used in industrial food processing facilities. Students will study foundational engineering principles including fluid flow, heat transfer,			

mass transfer, and thermal processing applied to food manufacturing. Emphasis is placed on plant layout, energy efficiency, hygiene design, and maintaining safety standards in modern food production environments.

Module 11

Code	Course/Module Title	ECTS	Semester
BFS105	Physical Chemistry	7	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Physical Chemistry This course explores the fundamental physical principles and mathematical frameworks underlying chemical systems and reactions. Students will examine core topics including thermodynamics, chemical kinetics, quantum chemistry, and molecular spectroscopy. Emphasis is placed on understanding energy transformations, reaction rates, and the microscopic behavior of matter to solve complex chemical problems.			

Module 12

Code	Course/Module Title	ECTS	Semester
ANP105	Occupational safety	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
Course Description: Occupational Safety This course introduces the fundamental principles, regulations, and practices required to maintain a safe and healthy working environment across various industries. Students will explore hazard identification, risk assessment, accident prevention, and compliance with local and international safety standards. Emphasis is placed on implementing protective measures, utilizing personal protective equipment (PPE), and fostering a proactive safety culture to minimize workplace injuries and occupational illnesses.			

Module 13

Code	Course/Module Title	ECTS	Semester
NTU200	Crimes of the Baath Regime in Iraq	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			

Secret police, state terrorism, torture, mass murder, genocide, ethnic cleansing, rape, deportations, extrajudicial killings, forced disappearances, assassinations, chemical warfare, and the destruction of the Mesopotamian marshes were some of the methods Saddam Hussein and the country's Ba'athist government used to ...

Module 14

Code	Course/Module Title	ECTS	Semester
NTU201	English language	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
<u>What do you learn from English language?</u> The study of English explores fascinating elements of both literature and language. How we communicate, how words and language have developed, and what this means for us and society. Studying English literature and language gives you the tools to analyse the spoken and written word critically and creatively. When first learning English , there are several key things to focus on in order to build a strong foundation for language proficiency . These include learning basic grammar rules , expanding vocabulary , practicing pronunciation , and developing listening and reading comprehension skills .			

Module 15

Code	Course/Module Title	ECTS	Semester
TAMO200	Biochemistry	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	78	72
Description			
Biochemistry combines biology and chemistry to study living matter. It powers scientific and medical discovery in fields such as pharmaceuticals, forensics and nutrition. With biochemistry, you will study chemical reactions at a molecular level to better understand the world and develop new ways to harness these. If you're going to study biochemistry carbohydrates, lipids, nucleic acids, and proteins. Not only is this one of the longest topics, it's also what I believe is the most essential on your own, start with learning the structures and functions of the 4 main macromolecules of the body:.			

Module 16

Code	Course/Module Title	ECTS	Semester
BFS200	Building entrepreneurial capabilities	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	72	150
Description			

Course Description: Entrepreneurial Capacity Building

This course equips students with the essential mindset, skills, and tools needed to identify business opportunities and turn innovative ideas into viable ventures. Learners will explore core concepts in opportunity recognition, resource mobilization, strategic planning, and leadership development. Emphasis is placed on practical problem-solving, resilience, and fostering the creative competencies required to thrive in dynamic economic environments.

Module 17

Code	Course/Module Title	ECTS	Semester
BFS 201	Molecular Biology	7	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Molecular Biology This course explores the molecular mechanisms governing the structure, function, and regulation of genetic material within living organisms. Students will examine core processes such as DNA replication, transcription, translation, and gene expression control. Emphasis is placed on modern molecular techniques, recombinant DNA technology, and their applications in scientific research and biotechnology.			

Module 18

Code	Course/Module Title	ECTS	Semester
BFS 202	Food Industries	7	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Molecular Biology This course investigates the molecular foundations of life, focusing on the synthesis, structure, and regulation of DNA, RNA, and proteins. Students will explore fundamental genetic processes including replication, transcription, translation, and cellular signaling pathways. Emphasis is placed on modern experimental techniques, genetic engineering, and the applications of molecular biology in biotechnology and medicine.			

Module 19

Code	Course/Module Title	ECTS	Semester
TAMO202	agricultural statistics	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	1	33	17

Description
Course Description: Agricultural Statistics This course introduces statistical methods and analytical techniques specifically applied to agricultural research and data collection. Students will learn how to design experiments, analyze field data, and interpret results using descriptive and inferential statistics.

Module 20

Code	Course/Module Title	ECTS	Semester
BFS 203	Biotechnical	3	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	42	75
Description			
Course Description: Biotechnology This course explores the manipulation of living organisms and biological systems to develop innovative technologies and products for medicine, agriculture, and industry. Students will examine core principles in genetic engineering, recombinant DNA technology, cell culture, and bioprocessing. Emphasis is placed on laboratory applications, ethical considerations, and leveraging biotechnology to address contemporary global challenges.			

Module 21

Code	Course/Module Title	ECTS	Semester
BFS204	Food Safety and Hygiene	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Food Safety and Hygiene This course examines the principles and practices necessary to ensure the safety, wholesomeness, and quality of food products throughout the entire food chain. Students will explore microbial hazards, foodborne pathogens, contamination prevention, and regulatory compliance standards such as HACCP and GMP. Emphasis is placed on sanitation procedures, personal hygiene, and effective management strategies to prevent foodborne illnesses in industrial and commercial settings.			

Module 22

Code	Course/Module Title	ECTS	Semester
BFS205	Genetically modified foods	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72

Description
Course Description: Genetically Modified Foods This course examines the scientific, ethical, and regulatory aspects of biotechnology applied to the global food supply and crop production. Students will explore the techniques used to alter plant and animal genomes, enhance nutritional profiles, and increase resistance to pests and environmental stressors. Emphasis is placed on biosafety assessments, environmental impacts, and public policy debates surrounding the commercialization of genetically modified organisms (GMOs).

Module 23

Code	Course/Module Title	ECTS	Semester
BFS206	food poisoning food poisoning	7	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	97
Description			
Course Description: Food Poisoning This course examines the causes, prevention, and management of foodborne illnesses resulting from microbial, chemical, and physical contamination. Students will investigate common pathogens, toxins, and vectors responsible for food poisoning outbreaks across the food supply chain. Emphasis is placed on epidemiological investigation, hazard analysis, and regulatory standards required to protect public health and ensure food safety.			

Module 24

Code	Course/Module Title	ECTS	Semester
BFS206	Food Analysis	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Food Analysis This course introduces the chemical, physical, and instrumental methods used to evaluate the composition, quality, and safety of food products. Students will learn standard analytical techniques for measuring moisture, proteins, lipids, carbohydrates, and food additives.			

Module 25

Code	Course/Module Title	ECTS	Semester
BFS 300	Dairy Chemistry	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72

Description
Course Description: Dairy Chemistry This course explores the chemical composition, structure, and physical properties of milk and its various dairy products. Students will examine key components such as proteins, lipids, carbohydrates, and minerals, along with the biochemical changes they undergo during processing. Emphasis is placed on quality control, chemical reactions during fermentation, and the scientific principles behind dairy manufacturing.

Module 26

Code	Course/Module Title	ECTS	Semester
BFS 301	Dairy Processing Techniques	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Dairy Processing Techniques This course explores the industrial processes, technologies, and equipment used in the conversion of raw milk into various commercial dairy products. Students will examine key manufacturing operations including pasteurization, homogenization, separation, fermentation, and cheese production.			

Module 27

Code	Course/Module Title	ECTS	Semester
BFS 302	Food Quality Control	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Food Quality Control This course examines the principles, methods, and management systems used to ensure that food products meet established safety, regulatory, and sensory standards. Students will study statistical quality control, hazard analysis, sampling techniques, and auditing frameworks such as HACCP and ISO standards. Emphasis is placed on defect prevention, regulatory compliance, and implementing continuous improvement strategies across food processing operations.			

Module 28

Code	Course/Module Title	ECTS	Semester
BFS 303	Food Biology	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47

Description
Course Description: Food Biology This course explores the biological principles underlying food systems, focusing on the roles of microorganisms, plants, and animals in food production and safety. Students will study microbial ecology, food spoilage mechanisms, beneficial fermentations, and the cellular structures of raw food materials.

Module 29

Code	Course/Module Title	ECTS	Semester
BFS 304	Automation of food factory management	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Course Description: Automation of Food Factory Management This course explores the integration of advanced automation, robotics, and digital control systems in modern food processing facilities. Students will examine programmable logic controllers (PLCs), SCADA systems, industrial sensors, and data analytics used to streamline manufacturing operations.			

Module 30

Code	Course/Module Title	ECTS	Semester
BFS 305	Circular Economy	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Circular Economy This course explores economic models and industrial strategies designed to eliminate waste and maximize the continual use of resources. Students will examine key concepts such as closed-loop systems, product lifecycle assessment, upcycling, and sustainable supply chain management. Emphasis is placed on redesigning business frameworks to decouple economic growth from resource consumption across various industrial sectors.			

Module 31

Code	Course/Module Title	ECTS	Semester
BFS 306	Food Chemistry	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72

Description
Course Description: Food Chemistry This course examines the chemical composition, physical properties, and interactions of major and minor components in food systems. Students will study the structure and behavior of water, carbohydrates, lipids, proteins, vitamins, and minerals, alongside food additives and pigments. Emphasis is placed on the chemical and biochemical changes that occur during food processing, storage, and preparation, and their impact on safety, flavor, and nutritional quality.

Module 32

Code	Course/Module Title	ECTS	Semester
BFS 307	food chain	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
"Laboratory Techniques is a course that educates students on the basics and modern techniques used in medical and scientific laboratories. This course includes studying how to handle laboratory tools and equipment, conducting medical tests and examinations, and applying safety and security standards in the lab. The focus is also on skills for analyzing samples and interpreting results scientifically. During this course, students also learn how to work as part of a team and achieve reliable results used for diagnosis and treatment."			

Module 33

Code	Course/Module Title	ECTS	Semester
BFS 308	Therapeutic Nutrition	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Therapeutic Nutrition This course examines the role of diet and medical nutrition therapy in the prevention, management, and treatment of various acute and chronic diseases. Students will study nutritional assessments, metabolic alterations in disease states, and customized dietary planning for clinical conditions such as diabetes, cardiovascular disorders, and gastrointestinal diseases. Emphasis is placed on evidence-based nutritional care, clinical decision-making, and improving patient health outcomes in healthcare settings			

Module 34

Code	Course/Module Title	ECTS	Semester
BFS 309	Sugar and Dates	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Sugar and Dates This course explores the agricultural production, biochemistry, and industrial processing of sugarcane, sugar beets, and dates. Students will examine extraction, refinement, crystallization, and preservation techniques, alongside the functional properties of sugars in food systems. Emphasis is placed on quality grading, value-added date products, and managing by-products within the confectionery and food processing industries.			

Module 35

Code	Course/Module Title	ECTS	Semester
BFS 400	Butter and Ice Cream	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Butter and Ice Cream This course examines the scientific principles, manufacturing technologies, and quality parameters involved in the production of butter and ice cream. Students will study the composition of cream, phase inversion processes in churning, and the complex colloidal structures of frozen desserts including emulsification and air incorporation. Emphasis is placed on formulation, processing techniques, rheological properties, and regulatory standards specific to these dairy products.			

Module 36

Code	Course/Module Title	ECTS	Semester
BFS 401	Meat and Meat Products Technology	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Meat and Meat Products Technology This course examines the scientific, technological, and hygienic principles involved in the processing, preservation, and packaging of meat and poultry products. Students will study muscle structure, conversion of			

muscle to meat, rigor mortis, and the chemical and physical changes that occur during processing and storage.

Module 37

Code	Course/Module Title	ECTS	Semester
TAMO401	Labor market skills	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Course Description: Labor Market Skills			
This course equips students with the practical, professional, and interpersonal competencies required to transition successfully into the professional workforce. Students will develop essential capabilities in critical thinking, effective communication, teamwork, project management, and digital literacy tailored to industrial environments. Emphasis is placed on career readiness, resume building, interview preparation, and adapting to the dynamic demands of the modern agricultural and food science sectors			

Module 38

Code	Course/Module Title	ECTS	Semester
BFS 403	grain manufacturing	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Course Description: Grain Manufacturing			
This course examines the harvesting, storage, milling, and industrial processing of cereal grains such as wheat, rice, corn, and barley into value-added food products. Students will study grain anatomy, cleaning, conditioning, grinding, and the production of flour and finished grain-based goods. Emphasis is placed on processing equipment, technological parameters, nutritional retention, and quality control standards in commercial grain manufacturing plants			

Module 39

Code	Course/Module Title	ECTS	Semester
TAMO400	Scientific research methodology	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72

Description
Course Description: Scientific Research Methodology This course introduces the fundamental principles, techniques, and ethical standards required to design and execute scientific research in food science and agricultural engineering. Students will learn how to formulate research questions, conduct literature reviews, choose appropriate qualitative and quantitative methodologies, and analyze experimental data. Emphasis is placed on experimental design, statistical validation, technical writing, and adherence to ethical guidelines in scientific inquiry

Module 40

Code	Course/Module Title	ECTS	Semester
TAMO401	Graduation Project	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	3	30	17
Description			
Course Description: Graduation Project This capstone course requires students to apply accumulated theoretical knowledge and technical skills to design, execute, and present a comprehensive independent research or engineering project. Students will work under faculty supervision to solve a practical problem in food science, biotechnology, or agricultural engineering through experimental work or system design. Emphasis is placed on project management, data analysis, critical thinking, technical writing, and a formal oral defense of the findings			

Module 41

Code	Course/Module Title	ECTS	Semester
BFS 405	Allergy and Food Analysis	8	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	122
Description			
Course Description: Allergy and Food Analysis This course examines the immunological basis of food allergies, intolerances, and the advanced analytical techniques used to detect allergens in food systems. Students will study major food allergens, cross-reactivity, and regulatory labeling requirements alongside laboratory methods such as ELISA, PCR, and mass spectrometry. Emphasis is placed on cross-contamination prevention, quality assurance protocols, and ensuring consumer safety in industrial food processing.			

Module 42

Code	Course/Module Title	ECTS	Semester
BFS 406	Food Manufacturing and Packaging	8	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	122
Description			
Course Description: Food Manufacturing and Packaging This course examines the integration of unit operations, processing technologies, and protective packaging systems used to transform raw agricultural materials into safe, shelf-stable food products. Students will study thermal and non-thermal preservation methods, assembly line mechanics, and the chemical, physical, and barrier properties of packaging materials such as polymers, metals, and glass. Emphasis is placed on extending product shelf-life, preventing microbial and environmental contamination, and optimizing industrial packaging lines for sustainability and cost-efficiency			

Module 43

Code	Course/Module Title	ECTS	Semester
BFS 407	Vegetable Oil Technology	8	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	122
Description			
Course Description: Vegetable Oil Technology This course examines the extraction, refining, bleaching, deodorization, and modification processes of various vegetable oils and fats. Students will study oilseed preparation, solvent extraction, chemical and physical refining methods, and hydrogenation or interesterification techniques. Emphasis is placed on chemical stability, oxidation mechanisms, quality parameters, and industrial applications in the food and oleochemical sectors.			

Module 44

Code	Course/Module Title	ECTS	Semester
BFS106	Biosecurity Safety	3	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	35	40
Description			

Course Description: Biosecurity Safety

This course examines the principles and protocols of biosecurity and biosafety required to protect agricultural, biotechnology, and food systems from biological threats and contamination. Students will study risk assessment, containment levels, regulatory frameworks, and emergency response procedures in laboratory and industrial environments. Emphasis is placed on pathogen control, biodefense strategies, and maintaining rigorous safety compliance across the food and life sciences sectors.

Contact

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مفردات المادة العلمية لقسم التقانات الاحيائية وعلوم الأغذية

MODULE DESCRIPTION FORM

level 1

Biotechnology and food science

MODULE DESCRIPTION FORM

Module Information				
Module Title	Democracy and human rights		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	NTU 100			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	One	Semester of Delivery		One
Administering Department	Biotechnology and food science		College	Technical Agricultural College
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date			Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Introducing the student to the most important laws related to human rights 2. Introducing the student to the most important Iraqi constitutions and their relationship to human rights. 3. Teaching the student to respect the freedom of others in dealing with him, taking into account the differences in cultures in the Iraqi environment
Module Learning Outcomes	1. Definition of human rights, goals of human rights 2. Learn about human rights through the divine books. 3. The student must have complete knowledge of human rights rules and the international and regional recognition of these rights 4. Teach the student that freedom of expression is guaranteed by the Iraqi Constitution 5. Identify the components of the social fabric and the differences in their cultures and languages.

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others and their different cultures. Obtaining new information in the field of human rights. Good training and familiarization with regional constitutions and their observance of human rights. Access to modern scientific literature. Participate in literary forums related to freedom of expression and respect for the opinions of others.
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Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Human rights, their definition, and goals.
Week 2	The roots of human rights and their development in human history. Human rights in ancient times
Week 3	Human rights in ancient civilizations, especially the Mesopotamian civilization
Week 4	Human rights in divine laws, with a focus on human rights in Islam
Week 5	Human rights in the Middle Ages. Human rights in doctrines, schools and political theories. Human rights in companies, their advertisements, revolutions, and constitutions
Week 6	Human rights in contemporary and modern history: international recognition of human rights
Week 7	Regional international recognition of human rights
Week 8	Non-governmental organizations and human rights
Week 9	National human rights organizations
Week 10	Human rights in Iraqi constitutions between reality and theory
Week 11	The relationship between human rights and public freedoms in the Universal Declaration of Human Rights
Week 12	The relationship between human rights and public freedoms in regional charters and national constitutions
Week 13	Necessary human rights and collective human rights
Week 14	Economic, social and cultural human rights and civil and political human rights
Week 15	Modern human rights: facts in development, the right to a clean environment

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	محاضرات في الديمقراطية و حقوق الانسان	Yes
Recommended Texts		
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information			
Module Title	English Language		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	NTU 101		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	One	Semester of Delivery	
Administering Department	Biotechnology and food science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Bashar Mohsin Mohammed able	e-mail	Bashar_mohsin.m@ntu.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Enabling students to obtain knowledge and introduction to the rules of the English language 2. Enabling students to obtain knowledge of the origins of speech and sentences and what they consist of and their types 3. Enabling students to obtain knowledge of the correct pronunciation of English vocabulary
Module Learning Outcomes	1. Students acquire general knowledge of the English language 2. Gaining students the ability to speak properly and in accordance with the principles of the language 3. Acquire and require the ability to correctly pronounce letters and vocabulary 4. Students acquire the skill of writing sentences correctly and with the fewest possible errors
Indicative Contents	Indicative content includes the following. <u>Part A - theoretical part</u> 1. Relying on accumulated information on the topic [2] 2. Relying on the ability to focus on information[2] 3. Clarifying the idea and defining the goal of the lesson[2] 4. The ability to collect information about the topic by asking questions[2]

	<u>Part B - practical part</u> 1. The skill of thinking according to the student's ability, and the goal of this skill is for the student to believe in what is tangible. [2] 2. Understanding when, what and how one should think and working to improve the ability to think sensibly. [2] 3. Observation and perception[2] 4. Analysis and interpretation[2] 5. Preparation and calendar[2] 6. Critical thinking strategy in learning[2]
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Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others.Obtaining new scientific information in the field of scientific research (videos).
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Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Hello!
Week 2	Your world
Week 3	All about you
Week 4	Family and friends
Week 5	The way I live
Week 6	Every day
Week 7	My favourites
Week 8	Where I live
Week 9	Time past
Week 10	We had a great time
Week 11	I can do that
Week 12	Please and thank you
Week 13	Here and now
Week 14	Its time to go
Week 15	Review of the article
Week 16	final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Headway plus , pre-intermediate student's book	Yes
Recommended Texts	2. Headway plus , intermediate student's book	Yes
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	Laboratory techniques		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 101			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	one	Semester of Delivery		
Administering Department	Biotechnology and food science		College	Technical Agricultural College
Module Leader	Maha A.M.AL_JAWADI		e-mail	Maha.a.aljawadi@ntu.edu.iq
Module Leader's Acad. Title	Teacher		Module Leader's Qualification	PhD
Module Tutor	Maha A.M.AL_JAWADI		e-mail	Maha.a.aljawadi@ntu.edu.iq
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date			Version Number	

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	Develop skills to conduct scientific experiments safely, learn modern techniques, critically analyze results, and deal with potential hazards in laboratories.
Module Learning Outcomes	1. Understanding Scientific Foundations: The ability to understand and apply the basic principles of laboratory science. 2. Use of Tools and Techniques: Proficiency in using modern laboratory tools and equipment. 3. Interpretation of Results: Skill in accurately analyzing and interpreting laboratory data. 4. Teamwork: Developing skills to work within a team to achieve common goals. Commitment to Safety: Commitment to safety and security standards in the laboratory environment.
Indicative Contents	1. Introduction to laboratory techniques: An overview of laboratory techniques in scientific research. 2. Initial lenses for training: Working on the use of basic and advanced elements. 3. Quality procedures in the laboratory: Detailed instructions on safety standards and how to handle delicate optional materials. 4. Analytical abbreviations: Abbreviated and chemical research methods using multiple techniques. Real applications: Studies and technical applications of laboratory techniques in different fields.

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others.Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

Structured SWL (h/sem)	63	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	37	Unstructured SWL (h/w)	5.8

Total SWL (h/sem)	150
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Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	For the most part, there is no need to find out for experienced guides and guides, because they will serve
Week 2	Use laboratory tools correctly
Week 3	Preparing solutions for cleaning glassware and tools and how to use them
Week 4	Types of blenders used in laboratories, specifications of each type, and the extent of its suitability for samples
Week 5	Preparation and calibration of various standard chemical solutions
Week 6	Preparation and calibration of various standard chemical solutions
Week 7	Handling different chemicals and methods of preserving them in the laboratory
Week 8	Handling different chemicals and methods of preserving them in the laboratory
Week 9	Operation and maintenance of the water treatment plant
Week 10	Operation of sensitive balances, their types, maintenance and calibration
Week 11	Operation and maintenance of various types of public places
Week 12	Operation and maintenance of hydrometers and electrical equipment and maintenance of electrodes
Week 13	Food Analysis Equipment Maintenance
Week 14	Use and calibrate a spectrophotometer
Week 15	Use and calibrate a spectrophotometer
Week 16	Operation and maintenance of milk composition analysis equipment

Delivery Plan (weekly practical

week	Material Covered
Week 1	Identify the most common laboratory tools and equipment and their uses.
Week 2	Use laboratory tools correctly
Week 3	Prepare and clean glassware and tools and how to use them
Week 4	Types of boilers used in laboratories and specifications of each type.
Week 5	Preparation and calibration of the seven different standard chemical solutions
Week 6	Preparation and calibration of the seven different standard chemical solutions
Week 7	Handling of the different chemical materials and methods of preserving them In the laboratory, the seven
Week 8	Handling of the different chemical materials and methods of preserving them In the laboratory, the seven
Week 9	Operation and maintenance of the distilled water device.
Week 10	Operation and maintenance of sensitive balances of their types, maintenance and calibration.
Week 11	Operation and maintenance of various types of microscopes
Week 12	Maintenance of food analysis devices
Week 13	Food Analysis Equipment Maintenance
Week 14	Use and calibrate a spectrophotometer
Week 15	Use and calibrate a spectrophotometer
Week 16	Operation and maintenance of milk composition analysis equipment

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Microbiology: A Laboratory Manual" <i>By James G. Cappuccino and Chad T. Welsh</i>	Yes
Recommended Texts		No
Websites	Website: https://www.who.int	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information						
Module Title	General Chemistry		Module Delivery			
Module Type	B		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar			
Module Code	TAMO 100					
ECTS Credits	6					
SWL (hr/sem)	150					
Module Level	One	Semester of Delivery		One		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College			
Module Leader		e-mail				
Module Leader's Acad. Title		Module Leader's Qualification				
Module Tutor	Hala awf abdalrahman	e-mail	Hala chilmeran 20@gmail .com			
Peer Reviewer Name	Name	e-mail	E-mail			

Scientific Committee Approval Date		Version Number	
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Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The student becomes familiar with the classification of chemical elements, types of acids, salts, and bases and their properties, and is able to detect them.
Module Learning Outcomes	- Identify solutions and methods of preparing them. - Identify the preparation of diluted and concentrated acids and stimulants. - Identify the principles of chromatographic analysis.
Indicative Contents	Indicative content includes the following. General Chemistry: You learn basic concepts such as atomic structure, electronic structure, ions, and forces operating between molecules.[10] Accurate analysis: To learn how to collect and extract a sample, analyze statistics, and use advanced technological measurements.[10] Thermodynamics and Kinetics: For practice in understanding the laws of thermodynamics and how they relate to chemical systems.[10] Spectrometry and Spectroscopy: Ratios between electromagnetic readings and matter have been discovered.[10].

Learning and Teaching Strategies	
Strategies	The necessity of visiting to gain experience from others.Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب الفصل	150		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
Week	Material Covered
Week 1	Periodic classification of elements
Week 2	Atomic structure
Week 3	Electronic distribution of atoms in the periodic table
Week 4	Electronic theory of valence
Week 5	Chemical bonds
Week 6	Acids base and salts
Week 7	Reduction and oxidation reactions
Week 8	Balancing in acidic and basic media
Week 9	Standard electrode voltage
Week 10	Nuclear chemistry
Week 11	The predominant nonmetallic elements
Week	Ideal gases

12	
Week 13	Halogens, their properties and preparation, general properties of group six elements
Week 14	General characteristics of the elements in the fifth group
Week 15	General properties of the elements in group four

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	A visit to the chemistry laboratory and learning about the devices and equipment
Week 2	Safety in chemical laboratories, dealing with chemicals (simple distillation, crystallization and filtration)
Week 3	Use of some laboratory equipment
Week 4	Data processing and results
Week 5	Estimate the boiling point
Week 6	Estimation of melting point
Week 7	Purification of chemical materials (simple distillation, crystallization and filtration)
Week 8	Estimation of dissolution yield
Week 9	Determination of molecular weight by the Victor Meyer method
Week 10	Estimating the molecular weights of non-ionized substances
Week 11	Estimation of equivalent weights (electrochemical method)
Week 12	Estimation of equivalent weights (electrochemical method)
Week 13	Estimating the reaction rate
Week 14	Estimation of chemical equilibrium
Week 15	Estimation of chemical equilibrium
Week 16	Exam

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	General chemistry,2014 مبادئ الكيمياء العامة ،دمحي الدين البكوش 2024	Yes
Recommended Texts	General Chemistry,2020	No
Websites	https://praxilabs.com/arabic/blog/6-most-important-chemistry-laws/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information					
Module Title	Principles of Microbiology		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar		
Module Code	BFS 102				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		one	Semester of Delivery		1
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader	Fawaz f		e-mail		
Module Leader's Acad. Title		Asst.lecture	Module Leader's Qualification		Master
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date			Version Number		

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Understand the basics of microorganisms (their classification, morphology, and cellular structures). Understand the methods of microbial growth and reproduction and the factors affecting them. Understand the relationship between microbes and human health. Acquire basic skills in the microbiology laboratory (sterilization, culture, microscopic examination).
Module Learning Outcomes	1. Classify microorganisms and understand their general characteristics. 2. Distinguish between prokaryotic and eukaryotic cells. 3. Explain the mechanisms of microbial growth and reproduction. 4. Apply the basics of microbiology laboratory work. 5. Identify the role of microorganisms in health and disease. 6. Explain the uses of microbes in applied fields.
Indicative Contents	Introduction and Classification of Microorganisms Definition of science, its types, and classification of microbes. Structure and functions of the microbial cell. Components of bacterial, viral, and fungal cells. Microbial growth and reproduction and influencing factors. Methods of reproduction, growth curves, environmental factors. Microbes in health, the environment, and applications. Their role in diseases, the environment, and industrial processes.

Learning and Teaching Strategies

Strategies	1. The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). 2. Practical training in the field. Access to modern scientific literature. 3. Participation in relevant scientific conferences. Scientific laboratories with other universities. 4.
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Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	97	Unstructured SWL (h/w)	5
Total SWL (h/sem)	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Introduction to microbiology, its history, and its importance in food science.
Week 2	Classification of microorganisms and their most important types that affect food.
Week 3	Prokaryotic and Eukaryotic Cells - Differences and Structures.
Week 4	Structure and functions of the parts of the microbial cell (wall, membrane, flagella...).
Week 5	Fungi, viruses, and protists associated with food.
Week 6	Methods of reproduction in microorganisms and their growth in food.
Week 7	Factors affecting microbial growth in food (temperature, humidity, pH...).
Week 8	Microbial control in food (sterilization, preservation, heat treatment).
Week 9	Introduction to Microbial Contamination of Food – Sources and Hazards.
Week 10	Foodborne pathogens (Salmonella, E. coli, Listeria...).
Week 11	Beneficial microbes in food (yeasts, lactic acid bacteria).
Week 12	Microbial fermentation and its applications in foods (e.g., yogurt, pickles, cheese).
Week 13	Microbial fermentation and its applications in foods (e.g., yogurt, pickles, cheese).
Week 14	Methods of detecting microorganisms in food (culture, staining, counting).
Week 15	Methods of detecting microorganisms in food (culture, staining, counting).
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly practical	
week	Microscope
Week 1	Staining of bacteria
Week 2	Acid fast bacteria staining method
Week 3	staining Spores
Week 4	Bacterial motility assay using a hanging drop
Week 5	Methods of counting bacteria
Week 6	How to calculate the area of a microscopic field:
Week 7	Counting bacteria by poured dish method:
Week 8	Sterilization methods:
Week 9	Sterilization methods:
Week 10	Nutritional media:
Week 11	Method of inhibiting bacterial growth
Week 12	Method of inhibiting bacterial growth
Week 13	Detection of pathogenic bacteria in food
Week 14	Detection of pathogenic bacteria in food
Week 15	Methods of counting bacteria
Week 16	Exam

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	• "Foundations in Microbiology" By Kathleen Park Talaro and Barry Chess – Focuses on core principles with strong visuals and clinical connections. • "Microbiology: Principles and Explorations" By Jacquelyn G. Black and Laura Black – Well-structured for undergraduate students; includes both theory and applied microbiology.	Yes

Recommended Texts	Principles of Microbiology	No
Websites	Website: https://microbiologysociety.org	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information					
Module Title	Agricultural production mechanization techniques		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar		
Module Code	BFS 100				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		one	Semester of Delivery		1
Administering Department		Biotechnology and	College	Technical Agricultural College	

		Food Science		
Module Leader	Maha A.M. AL-Jawadi		e-mail	maha.a.aljawadi@ntu.edu.iq
Module Leader's Acad. Title	lecture	Module Leader's Qualification		PHd
	YAHYA YOUNUS MOHSIN		e-mail	Mti.lec176.yahya@ntu.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1- Introducing students to the general concept of modern agricultural mechanisation technologies, as well as the importance of using agricultural machinery and equipment in various plant and animal production processes. 2- Provide students with the theoretical knowledge and practical skills necessary to understand, operate and maintain agricultural machinery used in agricultural production stages, thereby contributing to the development of their skills in handling these machines and equipment. 3- Prepare students to participate effectively in the development of the agricultural sector through the use of modern technology in all available machinery. 4- Equipping students with the ability to evaluate the performance of agricultural machinery and calibrate it to achieve the best results in different field conditions, thereby increasing the opportunity to increase productivity, improve efficiency and reduce costs.
Module Learning Outcomes	1. Ability to understand and apply mechanical principles in agricultural production in general, including both plant and animal production: This includes understanding the principles of nutrition, care, precision management, and various uses in production. 2- Ability to use modern techniques in agricultural production: Such as the use of modern techniques in fields and laboratories, new equipment and machinery in healthy nutrition, and targeted applications of modern innovations that enter the production line. 3- Ability to conduct production analysis: This includes assessing the quality of animal and plant products, production efficiency, and estimating the economic and other benefits of agricultural products used in nutrition.
Indicative Contents	1- Professionalism in handling agricultural machinery and equipment 2- Sustainability in managing agricultural resources 3- Training workers and encouraging trainees to work in the field of agricultural mechanization, encouraging them to work together to boost the economy and increase productivity.

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	5
Total SWL (h/sem)	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Agricultural buildings used for animal production and how to construct them
Week 2	Controlling environmental conditions inside animal pens
Week 3	Providing water to animal pens for daily consumption and storage
Week 4	Pumps used in animal production, their types and sizes, and choosing the best one for the project
Week 5	Agricultural buildings used for production and how they are constructed.
Week 6	Controlling environmental conditions inside animal pens.
Week 7	Mechanisation of animal feed production and storage.
Week 8	Technological methods for crushing animal feed
Week 9	Mechanisms for harvesting and collecting feed in the field
Week 10	Equipment for preparing soil for cultivation
Week 11	Sowing and planting techniques
Week 12	Fertilisation and spraying machines
Week 13	Field crop harvesting machines
Week 14	Automatic milking equipment and systems
Week 15	Types of maintenance and storage of machinery
Week 16	Preparatory week before the final Exam

Delivery Plan (weekly practical)

week	Material Covered
Week 1	Conditions that must be followed when designing agricultural buildings
Week 2	Mechanism to control temperature, humidity, and ventilation for barns
Week 3	Available and suitable water sources for farms
Week 4	Pump maintenance, cleaning and installation
Week 5	Conditions to be considered when designing agricultural buildings
Week 6	Temperature, humidity and ventilation control mechanisms for barns
Week 7	Maintenance and adjustment of feed baling equipment
Week 8	Feed mills and mixers and how they work
Week 9	Transport vehicles, their types, and how to connect them to agricultural tractors
Week 10	Ploughing and types of ploughs
Week 11	Understanding types of seeders and calibration methods
Week 12	Knowing methods of fertiliser distribution and spraying
Week 13	Distinguishing between harvesters and their types
Week 14	Learning preventive maintenance steps
Week 15	Safety guidelines when using agricultural equipment

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Principles of Agricultural Engineering, Volume I & II" <i>By T.P. Ojha and A.M. Michael</i> – A foundational text covering farm machinery, power sources, tillage, irrigation equipment, and harvesting technologies. In addition to the book on Agricultural Machinery and Equipment _ University of Mosul	no
Recommended Texts	Lectures on animal production mechanization equipment, written by Mahmoud Hassan Rafiq and Othman Moayed	No
Websites	Website: https://www.fao.org/agriculture/mechanization	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

level 2

Biotechnology and food science

MODULE DESCRIPTION FORM

Module Information						
Module Title	Computer		Module Delivery			
Module Type	B		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar			
Module Code	NTU 102					
ECTS Credits	3					
SWL (hr/sem)	75					
Module Level	one	Semester of Delivery		1		
Administering Department	Biotechnology and food science	College	Technical Agricultural College			

Module Leader	YAHYA YOUNUS MOHSIN		e-mail	Mti.lec176.yahya@ntu.edu.iq
Module Leader's Acad. Title	Teacher	Module Leader's Qualification		
Module Level			Semester of Delivery	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	4. Understand the basics of computing: Provide students with a basic understanding of computing concepts, including its history, development, and types of computing systems. 5. Learn to use operating systems and basic software: Provide students with basic skills to use operating systems effectively and learn to use office software such as word processors, spreadsheets, and presentation software. 6. Developing basic programming skills: Teaching students the basics of programming through programming languages such as Python or Java, enabling them to write simple programs and understand different programming concepts. 7. Learn about the basics of software engineering: clarify software engineering concepts such as analysis, design, and testing, and how to apply them in software development. 8. Enhancing practical skills and creative thinking: Encouraging students to solve computer problems in creative ways and use the acquired programming skills to produce effective solutions. 9. Promoting interaction and teamwork: Encouraging students to collaborate on group programming projects and in solving complex programming problems.
Module Learning Outcomes	1. Understand basic concepts in computer science such as data, software, hardware, and networks. 2. Ability to analyze problems and understand basic algorithms used in programming and software development. 3. Learn basic programming languages such as C, Python, or Java and understand the basics of writing and executing code. 4. Ability to use software development tools such as text editors and integrated development environments (IDEs). 5. Understand the concepts of information security and privacy in the context of technology use. 6. The ability to understand and analyze computer systems, networks, and communication concepts between devices. 7. Learn about artificial intelligence concepts and their basic applications. 8. Learn about the basics of operating systems and how to manage computer resources and processes.
Indicative Contents	1. Introduction to computer science and its history. 2. Basic concepts such as data, processing and storage. 3. Numerical systems and conversion between them (decimal, binary, octal, and hexadecimal). 4. Computer structure and its main units (central processor, memory, input/output). 5. Basic programming and algorithms. 6. Programming languages and software development methods. 7. Data structures and advanced concepts in programming. 8. Information security and privacy in computing. 9. Fundamentals of computer networks and communications. 10. Introduction to operating systems and resource management. 11. Basic artificial intelligence and machine learning concepts. 12. Ethics and social responsibility in the use of technology.

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) , Delivery Plan (Weekly Lab. Syllabus)

Week	Material Covered
Week 1	Definition of calculator - calculator generations - hardware and software components
Week 2	MS-Dos operating system, system concept, system signal, disks, directories and their levels, files, internal and external commands
Week 3	Internal and external operating system commands.
Week 4	Windows operating system, system concept, advantages, basic requirements, system operation, desktop components
Week 5	The concept of icons, the method of dealing with the mouse, the importance and components of the Task Bar, the Start menu, and exiting the system
Week 6	Formatting disks, copying files and folders, taking advantage of Cut and Paste operations, dealing with the Recycle Bin, how to delete files and recover them.
Week 7	Take advantage of Control Panel programs,
Week 8	Change the desktop background, control the Screen Saver, Add and remove programs to the start menu.
Week 9	Taking advantage of the Run command to execute programs directly.
Week 10	Use entertainment programs, Window media player, and take advantage of additional programs. Accessories
Week 11	Use entertainment programs, Window media player, take advantage of additional programs, and use the calculator.

Week 12	Working with the Paint drawing program to create, save and retrieve drawings. Dealing with Office applications. How to get help Help.
Week 13	The concept of computer viruses, how they are infected, types of viruses, how to treat them and deal with them using anti-virus programs.
Week 14	Windows 7 operating system, American company Microsoft, the company's official website www.microsoft.com
Week 15	. Dealing with desktop icons, dealing with the components of the My Computer icon in terms of disks, folders, and files.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	الكتاب المنهجي لوزارة التعليم العالي الجزء 1 والجزء 2 للمرحلة الاولى	No
Recommended Texts	سلسلة يسر المصطفى للعلوم " اساسيات الحاسوب والانترنت، الافس 2010 د. زياد محمد عبود، 2013	No
Websites	الامريكية، موقع Microsoft نظام التشغيل ويندوز 7، شركة مايكروسوفت www.microsoft.com الشركة الرسمي	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
معلومات المادة الدراسية				
Module Title	Arabic Language		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	NTU 103			
ECTS Credits	2			
SWL (hr/se3m)	50			
Module Level	One	Semester of Delivery		
Administering Department	Biotechnology and food science	College	Technical Agricultural College	
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	Amina mahir azeez		e-mail	Amina.mahir@ntu.edu.ig
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1-Preparing students who have the ability to pronounce correctly and write without errors .as much as possible 2.Encouraging the student to follow correct spelling rules 3.Paying attention to punctuation marks and how to use them in writing
Module Learning Outcomes	1-.Learn about the basic and important rules of the Arabic language 2.Focus on correct spelling rules . 3-Paying attention to a lot of reading and reading. To train the student on correct .pronunciation and writing without errors as much as possible
Indicative Contents	Instructional content includes the following Alert students to common linguistic errors, as well as benefit from correcting these errors _ in their formal and informal writing. (4 hours Knowing the necessary spelling rules. (4 hours_ Knowing punctuation marks and how to use them. (4 hours_
	Part B - practical part

Learning and Teaching Strategies

Strategies	1-Providing students with the basics and lectures related to the subject - 2.Use slide presentation methods to convey information more clearly 3-Urging students to read, read, and go to libraries
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Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	The concept of linguistic errors
Week 2	Rules for writing open ta's and open ta's
Week 3	The elongated alif and the short alif
Week 4	Solar letters and lunar letters
Week 5	Dhaad and Dhaa
Week 6	Writing the hamza: connecting and cutting, the middle hamza, the extreme hamza
Week 7	punctuation marks
Week 8	Exam
Week 9	The noun, the verb, and the difference between them
Week 10	The object, the absolute object, the object for its sake, the object in it, and the object with it
Week 11	Formal aspects of administrative discourse, the language of administrative discourse

Week 12	the number
Week 13	Applications of common linguistic errors
Week 14	Meanings of prepositions, the rule of alif al-fariqa, the rule of nun and tanween
Week 15	Exam
Week 16	Review the material before the final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Clear Dictation, Abdul Majeed Al-Naimi, Dahham Al-Kayyal, Dar Al-Mutanabbi Library, Baghdad, 6th edition, 1987 AD.	
Recommended Texts	Lessons in language, grammar, and dictation for state employees, Ismail Hamoud Atwan and others, Ministry of Education Press No. (3), Baghdad, 2nd edition, 1984 AD.	
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	Principles of Animal Production		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BFS103			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	One	Semester of Delivery	One	
Administering Department	one	Semester of Delivery	1	
Module Leader	Biotechnology and food science ANP		College	Technical Agricultural College
Module Leader's Acad. Title	Warqaa mohamood salih	e-mail		
Module Tutor		Module Leader's Qualification	Master	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Understand the basic principles of animal production. 2. Recognize animal production systems 3. Differentiate types of animal production 4. Identify factors affecting animal productivity 5. Apply animal welfare principles 6. Develop skills in livestock farm management
Module Learning Outcomes	- Identify types of farm animals and their importance. - Understand animal farming methods and production factors. - Learn the basics of animal feeding and reproduction. - Recognize common diseases and basic prevention methods. - Gain basic skills in animal management and handling
Indicative Contents	Indicative content includes the following. 1. Theoretical Part 1. Introduction to Animal Production ○ Definition and its economic and nutritional importance. 2. Classification of Farm Animals ○ Cattle, sheep, goats, poultry, etc. 3. Farming Systems ○ Traditional and intensive farming, and environmental effects. 4. Animal Nutrition ○ Types of feed and nutritional requirements. 5. Reproduction and Genetic Improvement ○ Mating methods, selection, and breed improvement. 6. Animal Health ○ Common diseases, basic prevention, and treatment methods. 7. Animal Welfare ○ Principles of humane treatment. 8. Farm Management ○ Housing organization, hygiene, and daily scheduling. 2. Practical Part 1. Identifying Different Animals Practically ○ External examination and breed identification. 2. Taking Simple Samples or Measurements ○ Such as weight, pulse, temperature (if tools are available). 3. Feeding Practice and Feed Types ○ Showing feed samples and mixing methods. 4. Field Visit to an Animal Farm (if available) ○ Observing farming systems, feeding areas, and animal housing. 5. Applying Animal Welfare Principles in the Field ○ How to handle animals gently and properly. 6. Simple Practical Project ○ For example, preparing a management plan for a specific animal (e.g., a cow or a small poultry flock).

Learning and Teaching Strategies	
Strategies	Learning strategies rely on diversifying teaching methods between interactive lectures and cooperative learning to enhance student understanding. Project-based learning and field visits encourage practical application and connect theory with reality. Presentations and case studies develop research and critical thinking skills, while hands-on training and short assessments ensure continuous evaluation. Educational technology also plays a key role in supporting and diversifying the learning process.

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب الفصل	150		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
Week	Material Covered
Week 1	Introduction to Animal Production and Food Science and Their Importance
Week 2	Types of Farm Animals and the Uses of Food for Humans
Week 3	Basics of Animal Farming Systems and Basic Food Components
Week 4	Environmental Factors Affecting Animal Production and Food Properties
Week 5	Types of Animal Feed and How to Choose Appropriate Feed
Week 6	Effects of Nutrition on Animal Health and Production, and Energy Value in Food
Week 7	Daily Animal Care and Principles of Food Safety
Week 8	Common Animal Diseases and Prevention Methods, and Food Contamination
Week 9	Basic Treatment for Animals and Food Preservation and Processing Methods
Week 10	Animal Welfare and Humane Treatment, and the Role of Technology in Food Science
Week 11	Animal Housing Organization and Farm Management, and Food Quality Analysis
Week	Vitamins and Minerals in Feed and Food and Their Health Impact

12	
Week 13	Human Nutrition and Its Effect on General Health and Its Relation to Animal Production
Week 14	Practical Projects and Applications in Animal Production and Food Science
Week 15	Field Visits and Practical Activities in Farms and Food Laboratories

Delivery Plan (Weekly Lab. Syllabus)

Week	Material Covered
Week 1	Identifying types of farm animals on the farm
Week 2	External examination of animals and breed identification
Week 3	Assessing feed quality and recognizing feed types
Week 4	Preparing suitable feed rations for animals
Week 5	Observing animal behavior and environmental effects
Week 6	Measuring basic vital signs (weight, temperature, pulse)
Week 7	Cleaning animal housing and maintaining hygiene standards
Week 8	Noticing common disease signs and reporting them
Week 9	Safe handling and animal welfare during examination
Week 10	Practical methods for feed storage and preservation
Week 11	Managing animal housing and space organization practically
Week 12	Simple laboratory analysis of feed samples
Week 13	Identifying vitamins and minerals in feed practically
Week 14	Preparing a small practical project for herd or farm management
Week 15	Field visit to a farm or lab and applying acquired skills

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	General chemistry,2014 مبادئ الكيمياء العامة، د.محي الدين البكوش 2024	Yes
Recommended Texts	General Chemistry,2020	No
Websites	https://praxilabs.com/arabic/blog/6-most-important-chemistry-laws/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
Module Title	Food Laboratory Engineering		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code	BFS 104		
ECTS Credits	8		
SWL (hr/se3m)	200		
Module Level	ONE	Semester of Delivery	1
Administering Department	Food Laboratory Engineering	College	Technical Agricultural College
Module Leader	Maha A.M. AL-Jawadi	e-mail	maha.a.aljawadi@ntu.edu.iq
Module Leader's Acad. Title	lecture	Module Leader's Qualification	PHd
	YAHYA YOUNUS MOHSIN	e-mail	Mti.lec176.yahya@ntu.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1- Preparing students who have the ability to work in the field of nutrition and food production laboratories in accordance with modern scientific curricula linked to developments in this field in advanced countries around the world. 2- Entering the agricultural sector with distinguished efficiency through participation in government projects and the labour market. 3- Food engineering technology is one of the specialisations offered by the Faculty of Engineering Technology. This specialisation is known as food technology, and students study food and all related matters. Students study food and drink, as well as the machinery used in the manufacture and storage of foodstuffs.
Module Learning Outcomes	1- Analysing factors affecting the design of food laboratories. 2- Designing preliminary layouts for food factories of all types. 3- Determining infrastructure and basic facility requirements. 4- Assessing the efficiency of operations within food laboratories. 5- Applying safety and quality concepts in design and operation.
Indicative Contents	Instructional content includes the following. Part A - Theoretical part Unit 1: Introduction to food laboratory engineering Definition of food laboratory engineering. The importance of laboratory engineering in the food industry. Factors affecting laboratory design. Unit 2: Selecting a location for a food laboratory Site selection criteria (geographical location, proximity to markets, raw materials). Economic and environmental factors. Legal and regulatory considerations. Unit 3: Food Laboratory Planning and Design Types of industrial layouts (linear, functional, mixed). Principles of laboratory design: pathways, spaces, flow. Infrastructure requirements (electricity, water, sanitation, ventilation). Unit 4: Public facilities in laboratories Ventilation and cooling systems. Water and wastewater treatment. Energy and fuel. Unit 5: Equipment and machinery in food production lines Classification of equipment according to manufacturing stages (receiving, cleaning, processing, packaging). Engineering criteria for equipment selection. Automated control techniques in production lines. Unit 6: Occupational health and safety in food laboratories

	Part B - practical part 1-Designing and planning a simple food laboratory using modern software. 2-Experimenting with the design of a ventilation and cooling system. 3-Measuring energy consumption in food processing units. 4-Field visit to a food laboratory (if possible). 5-Preparing an engineering feasibility model for a mini-laboratory.
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Learning and Teaching Strategies	
Strategies	Providing students with the basics and lectures related to the subject. Using slide presentation methods to convey information more clearly. Urging students to create animal diets and asking them to prepare scientific reports on topics related to nutrition.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	122	Unstructured SWL (h/w)	7
Total SWL (h/sem)	200		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction to food laboratory engineering
Week 2	Selecting a food laboratory location
Week 3	Food laboratory planning
Week 4	Laboratory infrastructure
Week 5	Equipment and production line layout
Week 6	Design of public facilities
Week 7	Occupational safety in food laboratories
Week 8	Quality systems in the food industry
Week 9	Building materials and interior fittings
Week 10	Economic factors in plant design
Week 11	Process analysis and performance efficiency
Week 12	Environmental considerations
Week 13	Designing a prototype for an integrated food laboratory
Week 14	Discussion of design projects and evaluation
Week 15	General review and preparatory test

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Discussion of course content, division into groups, presentation of food factory models, discussion of student expectations.
Week 2	Analysis of real food factory locations
Week 3	Preliminary sketch of a food factory layout
Week 4	Representation of infrastructure networks
Week 5	Designing the distribution of equipment and production lines
Week 6	Calculating the cooling load for cold rooms
Week 7	Preparing a model occupational safety plan
Week 8	Analyzing production risks and identifying critical control points (CCPs)
Week 9	Evaluate suitable building materials for laboratories
Week 10	Preparing a simplified feasibility study for a food laboratory
Week 11	Drawing and analyzing a process flow diagram (PFD)
Week 12	Designing a simplified liquid waste treatment system
Week 13	Initiate an integrated food laboratory design project
Week 14	Final project presentation
Week 15	Comprehensive practical review and evaluation

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	• Food Plant Design • book: Antonio Lopez-Gomez, Gustavo V. Barbosa-Cánovas • Handbook of Food Factory Design • : Christopher G. J. Baker Plant Layout and Design • book: James A. Muther	no
Recommended Texts	FAO – Food and Agriculture Organization	no

Websites	https://www.fao.org/fao-who-codexalimentarius
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Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 – 100	Outstanding Performance
	B - Very Good	Very good	80 – 89	Above average with some errors
	C - Good	Good	70 – 79	Sound work with notable errors
	D - Satisfactory	Average	60 – 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 – 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
Module Title	Physical Chemistry		Module Delivery	
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 105			
ECTS Credits	7			
SWL (hr/se3m)	175			
Module Level	ONE	Semester of Delivery		
Administering Department	Biotechnology and food science	College	Technical Agricultural College	
Module Leader	Halaa awf		e-mail	
Module Leader's Acad. Title	Module Leader's Acad. Title	Teacher		Module Leader's Qualification
Module Tutor			e-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module		Semester	

Co-requisites module		Semester	
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Module Aims, Learning Outcomes and Indicative Contents

Module Objectives

Understand fundamental concepts of thermodynamics, chemical kinetics, and quantum chemistry.

Explain the principles governing chemical equilibrium, reaction rates, and molecular structure.

Apply mathematical models and physical laws to solve problems related to chemical systems.

Design and conduct experiments to investigate physical and chemical properties.

Analyze and interpret experimental data using appropriate scientific methods.

Module Learning Outcomes

Describe and explain the fundamental principles of thermodynamics, chemical kinetics, quantum mechanics, and spectroscopy as they relate to chemical systems.

Apply laws and mathematical models to analyze chemical equilibria, reaction rates, and energy changes in physical and chemical processes.

Interpret experimental data and use computational tools to model molecular behavior and predict chemical phenomena.

Indicative Contents	Study the Fundamentals Thoroughly: Focus on understanding key concepts such as thermodynamics, kinetics, quantum mechanics, and equilibrium before moving to complex applications. Master Mathematical Tools: Develop skills in calculus, differential equations, and algebra as they are essential for solving physical chemistry problems. Engage in Laboratory Work: Participate actively in experiments to observe theoretical principles in action and gain practical skills in measurement and data analysis. Practice Problem-Solving Regularly:

Learning and Teaching Strategies

Strategies	Conceptual Understanding First Focus on grasping the underlying principles before diving into complex equations or problem-solving.
	Step-by-Step Problem Solving Break down problems into smaller parts, understand what is given and what is asked, then apply the appropriate laws or formulas.
	Visual Learning Use diagrams, graphs, and molecular models to better understand abstract concepts like energy levels, reaction mechanisms, and molecular orbitals.
	Regular Practice Consistently work on practice problems from textbooks, past exams, and assignments to build familiarity and confidence.

Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	97	Unstructured SWL (h/w)	7
Total SWL (h/sem)	175		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Physical Chemistry
Week 2	gases
Week 3	Molecular properties of gases
Week 4	Behavior of real gases at low temperatures and high pressure
Week 5	Thermodynamics
Week 6	Heat capacity, enthalpy
Week 7	Spontaneous processes and entropy (S)
Week 8	Gibbs Free Energy
Week 9	Applications to chemical reactions
Week 10	Calculating changes in energy, enthalpy, and entropy
Week 11	The concept of chemical equilibrium

Week 12	Le Chatelier's principle
Week 13	Chemical Kinetics
Week 14	ionic equilibrium
Week 15	Buffer Solutions, Solubility Product (K _{sp}), Precipitation and Equilibrium in Ionic Solutions

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Laboratory Safety Instructions
Week 2	Measurement of mass, volume, and density
Week 3	Boyle's Law, Measure the relationship between pressure and volume at a constant temperature.
Week 4	The relationship between volume and temperature at constant pressure.
Week 5	An experiment based on collecting hydrogen gas and using the ideal gas law.
Week 6	Use a simple calorimeter to measure the specific heat of a metal.
Week 7	Enthalpy measurement of a chemical reaction

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Physical Chemistry	Yes
Recommended Texts	Physical Chemistry	Yas
Websites	https://uomosul.edu.iq/agriculture/wp-content/uploads/sites/11/2023/09/%D9%86%D8%B8%D8%B1%D9%8A-6.pdf	

Grading Scheme

Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

level 2

Biotechnology and Food Science

MODULE DESCRIPTION FORM

Module Information			
معلومات المادة الدراسية			
Module Title	Crimes of the Baath regime in Iraq		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	NTU 200		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	Two	Semester of Delivery	
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	

Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	1. Providing students with basic concepts related to defining crimes, their types and categories. 2. Introducing the crimes and violations of the former regime and the types of international crimes 3. Introducing mass grave crimes and violations of Iraqi laws 4. Addressing environmental crimes, the destruction of cities, demographic change policies, and extrajudicial detention 5. Explaining the role of the Supreme Criminal Court in dealing with the crimes of the Baath regime
Module Learning Outcomes	1. Enabling students to understand the concept of crime and the types of national and international crimes. 2. Developing knowledge aspects related to human rights protection and guarantees. 3. Developing students' ability to distinguish between crimes and human rights violations and how to confront them
Indicative Contents	Indicative content includes the following. 1. Developing legal culture 2. 2- Carrying out his duties at work sites for professional motives. 3. 3- Instilling the values of tolerance and cooperation in society.

Learning and Teaching Strategies

Strategies	Periodic reports / periodic tests / practical case studies.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Crimes of the Baath regime according to the Law of the Supreme Iraqi Criminal Court in 2005 - The concept of crimes and their categories Definition of crime linguistically and idiomatically
Week 2	Crime departments - The crimes of the Baath regime according to the documentation of the Law of the Supreme Iraqi Criminal Court in 2005
Week 3	- Types of international crimes Decisions issued by the Supreme Criminal Court
Week 4	- Psychological and social crimes and their effects. - Psychological crimes - Mechanisms of psychological crimes Psychological effects of crimes
Week 5	Social crimes - Militarization of society - The Baath regime's position on religion
Week 6	- Violations of Iraqi laws Pictures of human rights violations and crimes of power
Week 7	Some decisions regarding political and military violations of the Baath regime
Week 8	Prison and detention places of the Baath regime
Week 9	Environmental crimes of the Baath regime in Iraq
Week 10	Military and radioactive contamination and mine explosions
Week 11	Destruction of cities and villages , scorched earth policy
Week 12	Drying the marshes Razing palm groves, trees and crops
Week 13	Mass grave crimes Introduction to mass graves
Week 14	Mass graves and genocide committed by the Baathist regime
Week 15	Chronological classification of genocide graves in Iraq
Week 16	The preparatory week before the final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Literature on crime, penal law, and human rights is available in the college library and the university's central library	Yes
Recommended Texts		
Websites	Human rights websites.	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information			
Module Title	English Language		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	NTU 201		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Bashar Mohsin Mohammed able	e-mail	Bashar_mohsin.m@ntu.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	10. Enabling students to obtain knowledge and introduction to the rules of the English language 11. Enabling students to obtain knowledge of the origins of speech and sentences and what they consist of and their types 12. Enabling students to obtain knowledge of the correct pronunciation of English vocabulary
Module Learning Outcomes	5. Students acquire general knowledge of the English language 6. Gaining students the ability to speak properly and in accordance with the principles of the language 7. Acquire and require the ability to correctly pronounce letters and vocabulary 8. Students acquire the skill of writing sentences correctly and with the fewest possible errors
Indicative Contents	Indicative content includes the following. <u>Part A - theoretical part</u> 5. Relying on accumulated information on the topic [2] 6. Relying on the ability to focus on information[2] 7. Clarifying the idea and defining the goal of the lesson[2] 8. The ability to collect information about the topic by asking questions[2]

	<u>Part B - practical part</u> 7. The skill of thinking according to the student's ability, and the goal of this skill is for the student to believe in what is tangible. [2] 8. Understanding when, what and how one should think and working to improve the ability to think sensibly. [2] 9. Observation and perception[2] 10. Analysis and interpretation[2] 11. Preparation and calendar[2] 12. Critical thinking strategy in learning[2]
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Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others.Obtaining new scientific information in the field of scientific research (videos).
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Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Hello!
Week 2	Your world
Week 3	All about you
Week 4	Family and friends
Week 5	The way I live
Week 6	Every day
Week 7	My favourites
Week 8	Where I live
Week 9	Time past
Week 10	We had a great time
Week 11	I can do that
Week 12	Please and thank you
Week 13	Here and now
Week 14	Its time to go
Week 15	Review of the article
Week 16	final exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	1. Headway plus , pre-intermediate student's book	Yes
Recommended Texts	2. Headway plus , intermediate student's book	Yes
Websites		

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
Module Title	Biochemistry		Module Delivery	
Module Type	S		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	TAMO 200			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		3
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	Ph.D.
Module Tutor			e-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	The student learns about the biochemical processes that occur within a plant in order for it to obtain food, grow, and produce.
Module Learning Outcomes	1- The course mainly identifies students on how to find out their military membership and non-vehicle status 2- Membership is focused on medically relevant topics 3- Knowledge of the biological and metabolic interactions within the human body and their relationship to diseases arising from disorders Metabolites and antiviral chemical clothing 4- Scientific knowledge of scientific techniques in a new medical procedure
Indicative Contents	- Part A - - Definition of the biochemistry , historical brief scope of the biochemistry . correlation [5] - Lipids (fatty materials) and fatty acids [5]. - Enzymes , vitamins , coenzymes [5]. - Metabolism of carbohydrates (brief) [5] - Part B - PH , Buffer solution , indicators , Physical Biochemistry colloids , imbibitions , viscosity . adsorption [10]. - Effect of the bases and acids on saccharides, Physical properties of fatty material [10]. - iodine No. polenski No. , Acydy no ., Millons test , sakoguchs test Aldenylde test .[10]. - Nucleic acids , metabolism of proteins , and others .[10].

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

1			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
Week	Material Covered
Week 1	Definition of the biochemistry , historical brief scope of the biochemistry . correlation
Week 2	Importance of the cell in the study of the biochemistry , Brief deception to the physical
Week 3	Water and reaction degree (PH)
Week 4	Chemistry of the carbohydrates
Week 5	Amino acids
Week 6	Peptides
Week 7	Lipids (fatty materials) and fatty acids
Week 8	Nudeo acids
Week 9	Enzymes , vitamins , coenzymes
Week 10	Bioenergetic (out lines)
Week 11	Bioenergetic (out lines)
Week 12	Metabolism of carbohydrates (brief)
Week 13	Metabolism of carbohydrates (brief)
Week 14	Metabolism of carbohydrates (brief)
Week 15	Metabolism of carbohydrates (brief)

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	PH , Buffer solution , indicators .
Week 2	Physical Biochemistry colloids , imbibitions , viscosity . adsorption .
Week 3	Reduction of the Benedict solutions Bar foods solution .
Week 4	Reduction of the, mono sacchordes formations of the ozazon fchilink test .
Week 5	Effect of the bases and acids on sacchorides
Week 6	Physical properties of different types of sacchorides
Week 7	Physical properties of fatty material
Week 8	Fat constant's acid number saponification number .
Week 9	iodine No. polenski No. , Acydy no .
Week 10	Testes on the oils .
Week 11	Millons test , sakoguchs test Aldenyde test .
Week 12	Chemical analysis of the material prsteis solubility .
Week 13	Biuret test .
Week 14	Sengers test .
Week 15	Nudeo acids , metabolism of protam , and others .
Week 16	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الكيمياء الحياتية د. طارق يونس احمد ولؤي عبد علي الهلالي 2012	Yes
Recommended Texts	bioChemistry, 2020	No

Websites	http://ocw.mit.edu/courses/biology/7-013-introductory-biology-spring-2013/
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Food industries		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS202			
ECTS Credits	7			
SWL (hr/se3m)	175			
Module Level	TWO	Semester of Delivery		
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader	Ameen R. Ali		e-mail	ameen.r.ali@ntu.edu.iq
Module Leader's Acad. Title	Ass. Lecturer		Module Leader's Qualification	Master
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Understand the principles of food processing and various preservation methods, such as pasteurization, sterilization, drying, and freezing. Understand the properties of raw food materials and the effects of processing on them. Implement the production steps of food products such as dairy, juices, jams, and others. Perform simple analyses to assess food quality and safety (e.g., moisture, protein, fat, pH). Adhere to food and laboratory safety standards during manufacturing and testing. Develop practical skills and teamwork within a laboratory or production environment. Professional preparation for work in the food industry or quality control.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student explains the basic principles of food manufacturing and preservation processes. Distinguishes between different manufacturing techniques and their impact on food quality. Applies simple food production steps in a safe and correct manner. Performs basic analyses to assess the quality of food products. Adheres to safety procedures in the laboratory and manufacturing environment. Works effectively within a team and prepares practical reports documenting experimental results. Evaluates the quality of food products according to approved standards.

Indicative Contents المحتويات الإرشادية	Introduction to the Food Industry Importance of the Food Industry Classification of Food Products Characteristics of Raw Food Materials Milk, Fruits, Vegetables, Meat, Grains Basic Manufacturing Processes Pasteurization, Sterilization, Drying, Freezing, Fermentation Food Preservation Techniques Heat Preservation, Refrigeration, Preservatives, Packaging Production of Some Processed Foods Dairy (Yogurt, Cheese) Juices and Jams Canned Foods and Pickles Food Quality and Safety Quality Standards Food Contaminants Production Line Hygiene Basic Nutritional Analysis Moisture, Fat, Protein, pH, Acidity Food Packaging
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم
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Strategies	1. Active Learning: Students are encouraged to actively participate in the learning process through hands-on experiences, group projects, and interactive activities. 2. Project-Based Learning: Students are assigned applied projects that require them to apply the concepts and skills they have learned in a real-world context. 3. Research-Based Learning: Students are encouraged to conduct their own research and explore topics of interest to them. 4. Collaborative Learning: Students are encouraged to work together in groups to solve problems and complete projects. 5. Self-Directed Learning: Students are encouraged to take responsibility for their own learning and develop independent learning skills. 6. Discussion-Based Learning: Students are encouraged to participate in group discussions to promote critical thinking and effective communication.
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Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	97	Unstructured SWL (h/w)	7
Total SWL (h/sem)	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوع، ي النظري

	Material Covered
Week 1	The importance of food industries and how they emerged and developed
Week 2	Main food industries and methods used in establishing a new industry
Week 3	Food components
Week 4	Lipids
Week 5	Dyes (coloring materials)
Week 6	Oxidants and antioxidants
Week 7	Meat, white and fish proteins
Week 8	Sources of oils and fats:
Week 9	Spoilage of oils and fats
Week 10	Food preservation methods
Week 11	Freezing
Week 12	The effect of freezing on food
Week 13	Food packaging
Week 14	Thermal treatments
Week 15	Cans and their manufacture

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوع، ي للجزء العملي

	Material Covered
Week 1	Determination of Moisture Content
Week 2	Determination of Ash Content
Week 3	Fat Content Determination (Soxhlet Method)
Week 4	Protein Content Determination (Kjeldahl Method)
Week 5	Carbohydrate Estimation (By Difference)
Week 6	Acidity and pH Measurement
Week 7	White Soft Cheese Production
Week 8	Yogurt Production
Week 9	Jam Production
Week 10	Juice Processing and Preservation
Week 11	Oil Quality Test – Peroxide Value
Week 12	Food Packaging and Labeling
Week 13	Mini Food Product Development Project
Week 14	Final Lab Exam & Report Submission
Week 15	Final Lab Exam & Report Submission

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الصناعات الغذائية	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

(50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	Molecular Genetics		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BFS 201			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	TWO	Semester of Delivery		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader		e-mail		
Module Leader's Acad. Title		Module Leader's Qualification		
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	4. The structure of the animal chromosomes . 5. Introducing the student to the most important basic information about the Genetics, their structure, classification and arrangements. 6. Teaching and training the student to know the Animal Genetics and the general features of it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The collection of useful information about the animal Genetics and Hereditary traits . 2. the students has a full knowledge of the Differentiation and identification of different animal breeds and breeding . 3. the students has a good knowledge of molecular techniques.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - theoretical part</u> The structure of the animal chromosome and gene expression analysis [3 hrs] The function of each part of the chromosome. [3 hrs]

Part B - practical part

The structure of the animal cell and the shape of each organelles. [9 hrs].

The structure of the animal chromosome and gene expression analysis. [9 hrs].

The structures of each animal chromosome and gene expression analysis. [9 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 60 ساعة			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Cell, cell division
Week 2	Reproduction, ,
Week 3	Meiosis
Week 4	sex differences in animals
Week 5	Exam
Week 6	Genetic code and molecular structure of genes
Week 7	Johann Mendel, his experiments, ,
Week 8	general Mendelian equations
Week 9	dominant and recessive genes
Week 10	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 11	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 12	Lethal and semi-lethal genes
Week 13	, biosimilar genes,
Week 14	supervital genes
Week 15	Alleles and multiple effects

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

week	Material Covered
Week 1	Identify the components of the animal cell
Week 2	Problems on Mendel's first law, problems on back multiplication, problems on Mendel's second law
Week 3	Issues on incomplete dominance
Week 4	Issues on incomplete dominance
Week 5	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 6	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 7	Issues on the genetics of hair scarcity in cattle
Week 8	Issues on the inheritance of fur in rabbits
Week 9	Issues on the inheritance of crest shape in chickens
Week 10	Issues on the inheritance of sex determination in humans, issues on embryonic ratio
Week 11	Issues on the inheritance of color blindness in humans, issues on the inheritance of blood thinners
Week 12	Problems on connection, problems on transitivity, problems on complete connection
Week 13	Problems on connection, problems on transitivity, problems on complete connection
Week 14	Problems on Hardy-Weinberg's law, problems on embryonic replication

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Genetics Natasha Ramroop Singh, Kamloops, British Columbia Copyright Year: 2009	no
Websites	https://kidshealth.org/en/parents/about-genetics.html	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية				
Module Title	Building entrepreneurial capabilities		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BFS 200			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	Two	Semester of Delivery	Three	

Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	This course aims to develop entrepreneurial skills among Food Science students by introducing them to the concepts of innovation and entrepreneurship, enabling them to create innovative food-related ideas and projects that meet market needs and provide effective solutions to challenges in the food sector.
Module Learning Outcomes	1. Understands the meaning of entrepreneurship and innovation. 2. Identifies opportunities and problems in the food sector. 3. Suggests new ideas for food-related projects. 4. Designs a simple business model. 5. Writes a basic business plan. 6. Works effectively in a team. 7. Presents ideas clearly and confidently. 8. Uses creative thinking to solve problems.
Indicative Contents	The course covers the basics of entrepreneurship and innovation in Food Science, focusing on idea generation, market analysis, and business model design. It includes design thinking skills, business plan preparation, marketing, and financing. Students also work on a group project to develop and present a food-related entrepreneurial idea by the end of the course.

Learning and Teaching Strategies

Strategies	Learning strategy is the method teachers and students use to organize the learning process to achieve the best understanding and skills. It relies on interactive activities, teamwork, and problem-solving to motivate students and effectively develop their abilities.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	• What is entrepreneurship and innovation?
Week 2	• How do we understand the food market?
Week 3	• How do we think entrepreneurially?
Week 4	• How do we analyze market opportunities?
Week 5	• How do we come up with new ideas?
Week 6	• What is design thinking?
Week 7	• How do we design a business model?
Week 8	• How do we plan a project?
Week 9	• How do we write a business plan?
Week 10	• How do we market our products?
Week 11	• Where do we get funding?
Week 12	• Laws and ethics in the food field
Week 13	• Examples of successful food projects
Week 14	• Working on a practical project
Week 15	• Presenting and learning from our projects

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<i>Food Entrepreneurship: Innovation and Business Opportunities</i> – Karina A. Stanley	no
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (فقد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information			
معلومات المادة الدراسية			
Module Title	Agricultural statistics		Module Delivery
Module Type	Supportive		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	TAMO 202		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	TWO	Semester of Delivery	
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	Providing the student with experience in how to design experiments, then collect data, classify it, analyze it, then summarize it and come up with a recommendation to solve the problem for which the experiment was conducted.
Module Learning Outcomes	Creating a solid scientific basis in the theoretical and practical aspects applied in the field of istical programs. Providing the student with the skill of collecting primary data and summarizing it to solve the problem to be studied
Indicative Contents	Indicative content includes the following. <u>Part A - theoretical part</u> Completely randomized design, advantages, disadvantages, use of the design if one observation is recorded for each experimental unit, A- if the number of repetitions is equal

	Part B - practical part
	Statistical analysis of data

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب 15 اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week 1	The concept, importance, objectives and benefits of the agricultural census Agricultural census methods - types of samples - problems and obstacles to the agricultural census - sources of errors in the agricultural census
Week 2	Measures of dispersion
Week 3	Steps to implement the agricultural census, land statistics, agricultural production statistics - benefits of agricultural statistics
Week 4	General definitions, experiment, design, working experimental unit, experimental error, conditions for controlling experimental error, basic rules for designing experiments, requirements for a good experiment, steps followed in scientific experiments.
Week 5	Completely randomized design, advantages, disadvantages, use of the design if one observation is recorded for each experimental unit, A- if the number of repetitions is equal
Week 6	Completely randomized design, advantages, disadvantages, using the design in the case of recording one observation for each experimental unit, b - in the case of unequal repetitions.
Week 7	Diagnosing the significance of differences between arithmetic means, the coefficient of variation in the experiment. Completely randomized block design, conditions for using the design, advantages and disadvantages of the design, sources of variation.
Week 8	Analysis of variance, determining the number of replicates, estimating the missing value (or more) in segments
Week 9	Latin square design, terms of use, advantages and disadvantages of the design.
Week 10	Sources of variation in Latin square, analysis of variance, missing value estimation or more.
Week 11	Factorial experiments, their conditions, advantages and disadvantages
Week 12	Sources of variation in factorial experiments, analysis of variance, interaction and its types.
Week 13	Split panel design, conditions, advantages, disadvantages
Week 14	Sources of variation in split plate experiments, analysis of variance
Week 15	Correlation and regression

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	Measures of dispersion
Week 2	A continuation
Week 3	Types of experiments, how to plan the experiment, and researcher specifications.
Week 4	Solve exercises to analyze data for a completely randomized design
Week 5	Solve exercises on determining the significance of differences between means
Week 6	Solve exercises to analyze data from a randomized complete block design
Week 7	Exercises to find the missing value in completely randomized blocks
Week 8	Latin square, design, analysis of sources of variation.
Week 9	Solve exercises to analyze the sources of variation in the design of the Latin square
Week 10	Solve exercises to analyze the sources of variation in the design of the Latin square
Week 11	designing factorial experiments
Week 12	Solve exercises for designing factorial experiments
Week 13	To analyze the variation of sources of variation in split panel designs
Week 14	Solve exercises to analyze the variance of sources of variation in split panel designs
Week 15	Solve exercises to find correlation and regression coefficients.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Design and analysis of experiments book	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	(راسب) قيد المعالجة (راسب)	(45-49) (0-44)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	Biotechnical		Module Delivery		
Module Type	B		☒ Theory ☐ Lecture Lab ☐ Tutorial Practical ☐ Seminar		
Module Code	BFS203				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		TWO	Semester of Delivery		5
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail		
Module Leader's Acad. Title			Module Leader's Qualification		Master
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date			Version Number		

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	□ Understand fundamental biotechnology principles and how they apply to food. □ Learn how microorganisms, enzymes, and genetic tools are used in food production, processing, and preservation. □ Gain ability to assess and ensure food safety and quality using modern biotechnological methods. □ Explore issues around genetically modified organisms (GMOs), regulations, and ethical considerations. □ Develop basic lab skills: experiment design, data analysis, diagnostics in food biotechnology.
Module Learning Outcomes	□ Describe the basic principles of biotechnology and how they apply to food production, processing, and preservation. □ Explain the role of microorganisms, enzymes, and genetic engineering in developing new or improved food products. □ Identify risks from genetically modified organisms (GMOs), contaminants, or pathogens, and apply safety and quality control methods. □ Design simple experiments or processes in food biotechnology (e.g. fermentation, enzyme use), collect data, analyze results, and interpret conclusions.
Indicative Contents	Introduction to Biotechnology Definition of Biotechnology and its Historical Development Foundations and Methods of Biotechnology Foundations and Methods of Biotechnology and its Applications in Food Manufacturing Industrial Fermentations Types of Bioreactors Utilization of Food Industry Waste Utilization of Food Industry Waste in the Production of High-Economic Value Products Enzymes and Food Manufacturing Enzymes and Food Manufacturing New Developments in Food Biotechnology New Developments in Food Biotechnology

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3.13
Total SWL (h/sem)	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Introduction to Food Biotechnology
Week 2	Isolation and preservation of industrial microorganisms
Week 3	Methods of preserving industrial microbiological cultures
Week 4	Development methods used in biotechnology
Week 5	Liquid State Fermentation
Week 6	Solid State Fermentation
Week 7	Genetic improvement of industrial microorganisms
Week 8	Hybridization
Week 9	Metabolic pathways in industrial microorganisms
Week 10	Sources of industrial microorganisms and methods of preserving them
Week 11	Nutritional and growth requirements for industrial organisms
Week 12	Nutritional media
Week 13	Additives to food media
Week 14	Additives to food media
Week 15	Nutritional and growth requirements for industrial organisms
Week 16	exam

Delivery Plan (weekly practical)

week	Material Covered
Week 1	Biotechnology and Microbiology:
Week 2	Use of ultraviolet radiation for genetic disinfection
Week 3	Isolation of microorganisms from different sources
Week 4	Preparing the vaccine for the production process:
Week 5	Preservation of industrial microorganisms
Week 6	Fermenter
Week 7	Production of industrial alcohol (ethanol):
Week 8	baker's yeast production
Week 9	Yeast vitality and activity assessment:
Week 10	How to separate yeast cells
Week 11	Anatomy of the female reproductive system
Week 12	Preparation of bacterial and yeast vaccine:
Week 13	Preparation of bacterial and yeast vaccine:
Week 14	Mycelium vaccine preparation:
Week 15	Preparation of mold spore inoculum by solid culture method:
Week 16	Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Food Biotechnology, Second Edition by Anthony Pometto, Kalidas Shetty, Gopinadhan Paliyath & Robert E. Levin — covers microbial applications, genetic engineering, functional foods, safety, enzyme tech.	Yes
Recommended Texts	Applied Food Biotechnology (AFB) — applied studies: food production, enzymes, microbiology, packaging materials.	No
Websites	Wiley — has many textbooks and journal articles under Food Biotechnology subject.	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information						
معلومات المادة الدراسية						
Module Title	Food safety and health		Module Delivery			
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar			
Module Code	BFS 204					
ECTS Credits	6					
SWL (hr/se3m)	150					
Module Level	FOUR	Semester of Delivery	5			
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College			
Module Leader		e-mail				
Module Leader's Acad. Title		Module Leader's Qualification				
Module Tutor		e-mail				

Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Identify sources of food contamination and their transmission. Understand personal hygiene practices for food handlers. Learn proper methods of food storage and preservation. Apply safe food handling and preparation techniques. Recognize the importance of food safety in preventing foodborne illnesses. Become familiar with food safety laws and standards. 4- Develop basic skills to inspect food for spoilage or contamination.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6- ? Explain the basic concepts of food safety and hygiene. 7- ? Differentiate between types and sources of food contamination. 8- ? Apply personal hygiene and safety practices in food handling. 9- ? Evaluate food storage and preservation methods for safety and quality. 10- ? Interpret food safety laws, regulations, and standards. 11- ? Analyze causes of foodborne illnesses and methods of prevention. 12- ? Conduct basic inspections to detect food spoilage or contamination.
Indicative Contents المحتويات الإرشادية	? Introduction to Food Safety and Hygiene ? Types and Sources of Food Contamination ? Personal and General Hygiene Practices ? Food Storage and Preservation Methods ? Safe Food Preparation and Serving ? Foodborne Diseases and Prevention ? Food Safety Laws and Regulations

	Part B - practical part Microscope and its parts. Types of microscopes and their functions. Animal cell shapes. Animal cell divisions. Anatomy of a type of farm animal, such as a rabbit.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	📌 Lectures and Presentations: To explain key concepts and theories. 📌 Group Discussions: To encourage sharing ideas and problem-solving. 📌 Practical Demonstrations: Hands-on practice for safe food handling and hygiene. 📌 Case Studies: Analyze real-life examples of food safety incidents. 📌 Quizzes and Assessments: To evaluate understanding and retention. 📌 Role-playing: Simulate food safety scenarios to apply knowledge. 📌 Field Visits: Visits to food processing or inspection facilities (if possible).

Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	22	Unstructured SWL (h/w)	1.46
Total SWL (h/sem)	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Food Safety: definitions, scope, importance; historical cases of foodborne illness.
Week 2	Types of Hazards in Food: biological, chemical, physical, allergenic hazards.
Week 3	Microorganisms & Foodborne Illnesses: pathogens, spoilage organisms, growth conditions.

Week 4	Food Contamination & Cross-Contamination: sources, routes, prevention.
Week 5	Hygiene & Sanitation Principles: facility sanitation, equipment, cleaning & disinfection.
Week 6	Personnel Hygiene and Training: hand washing, protective clothing, behavior in food handling.
Week 7	Water and Air Quality in Food Operations; Pest Control & Waste Management.
Week 8	Food Storage, Packaging, Temperature Control: shelf life, cold chain, packaging materials.
Week 9	Food Preservation Techniques: heat treatments, drying, freezing, novel / non-thermal methods.
Week 10	Food Additives, Preservatives & Residues: safe levels, regulations, chemical hazards.
Week 11	Food Safety Management Systems: GMP, GHP, PRPs (Prerequisite Programs).

Week 12	HACCP: Principles, Steps, Implementation, Verification & Validation.
Week 13	Standards & Certifications: ISO 22000, BRC, IFS, other international / regional food safety standards.
Week 14	Legal Aspects, Ethics, Traceability & Consumer Right: food labeling, recalls, trace backs.
Week 15	Emerging Risks & New Technologies: new pathogens, novel processing methods, food fraud, climate change impacts.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للجزء العملي	
	Material Covered
Week 1	Indicators Microbial
Week 2	Isolation of Bacillus bacteria
Week 3	Clostridium food poisoning bacteria
Week 4	• Food botulism poisoning:
Week 5	Perform serial dilutions of the sample to be detected.
Week 6	Isolation and cultivation of E. coli bacteria
Week 7	Isolation of Salmonella and Shigella bacteria
Week 8	Detection of Staphylococcus aureus bacteria
Week 9	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.
Week 10	Detection of Staphylococcus aureus bacteria
Week11	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.

Week12	Methods of taking, storing, and transporting food samples to the laboratory:
Week13	Health of food facility workers and methods of monitoring it
Week14	Methods of taking, storing, and transporting food samples to the laboratory:
Week15	Methods of taking, storing, and transporting food samples to the laboratory:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Institute of Food Science & Technology (IFST) — has many technical briefs, guidance documents, fact sheets, webinars on food safety, allergens, labelling etc. Institute of Food Science and Technology USDA National Agricultural Library — Food Safety Research Information Office; databases and guides to help with finding research on food safety. nal.usda.gov Food Safety: The Science of Keeping Food Safe (2nd Ed.)	Yes
Recommended Texts	Food Safety	Yas
Websites	https://www.perlego.com/book/992564/food-safety-the-science-of-keeping-food-safe-pdf?utm_source=chatgpt.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

(50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	(قيد المعالجة) راسب	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	Food analysis		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar		
Module Code	BFS 207				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		TWO	Semester of Delivery		6
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail		
Module Leader's Acad. Title			Module Leader's Qualification		
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

Relation with other Modules			
Prerequisite module			
Co-requisites module			

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	☐ Understand the principles of food analysis techniques. ☐ Identify major components of food (e.g., moisture, protein, fat, ash). ☐ Apply standard methods for analyzing food quality and composition. ☐ Interpret analytical data and evaluate food products. ☐ Ensure accuracy and reliability in laboratory testing. ☐ Recognize the importance of food analysis in safety and regulation.
Module Learning Outcomes	Explain the basic principles and importance of food analysis. Identify and describe common analytical techniques used in food testing. Perform standard laboratory procedures to analyze food components (e.g., moisture, fat, protein). Interpret and report analytical data accurately. Evaluate food quality and safety based on analysis results.
Indicative Contents	1. Introduction to Food Analysis – Importance, applications, and role in food quality control. 2. Sampling and Sample Preparation – Techniques for collecting and preparing samples for analysis. 3. Moisture and Ash Content Analysis – Methods for determining water and mineral content in food. 4. Protein Analysis – Kjeldahl and other methods to measure protein content. 5. Fat Analysis – Extraction methods (e.g., Soxhlet, solvent extraction). 6. Carbohydrate Analysis – Determination of sugars, starch, and dietary fiber. 7. Vitamin and Mineral Analysis – Techniques for detecting micronutrients in food. 8. Additives and Contaminants Detection – Analysis of preservatives, colorants, and harmful substances. 9. Instrumental Methods in Food Analysis – Use of spectrophotometry, chromatography, etc. 10. Quality Control and Data Interpretation – Ensuring accuracy, precision, and reporting results. Let me know if you need this tailored to a specific academic level or format!

Learning and Teaching Strategies	
Strategies	1. Explanation and clarification. 2. Lecturing. 3. Lecturing. 4. Playing videos and displaying images. 5. Daily and monthly exams.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	(High-Performance Liquid Chromatography, HPLC)
Week 2	Principles of Microbiological Assays
Week 3	Methods Microbiological
Week 4	(Reliability of Microbial Assays
Week 5	Poultry feeding with pellets: advantages and disadvantages, influencing factors
Week 6	Microbiological Assays and Feeding Tests
Week 7	Microbiological Methods for Assessing the Nutritional Value of Proteins)
Week 8	Enzymatic Methods In Food Analysis
Week 9	Determination of Inhibitors
Week 10	Electrophoresis
Week 11	Chromatography Gas
Week 12	(compounds of analysis Quantitative(
Week 13	Gas-liquid chromatography
Week 14	Flame atomic absorption spectrometer
Week 15	Chromatography distribution

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	Preparation of standard solutions
Week 2	Adjusting the acidity of solutions
Week 3	Humidity estimation
Week 4	ASH Determination
Week 5	Fat Determination
Week 6	Spectrophotometer
Week 7	Nuclear Magnetic Resonance
Week 8	Specific gravity and Refractive index
Week 9	Digestion Extraction
Week 10	Total protein estimation:
Week 11	DETERMINATION OF ACIDITY AND ORGANIC ACIDS
Week 12	determination Fiber)
Week 13	Chemical additives estimate
Week 14	Second hand estimate of the carbon dioxide
Week 15	)curve Standard

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	☐ – Standard reference for validated analytical methods in food testing. ☐	
Recommended Texts	داللي ، باسل كامل و صادق حسن الحكيم . كتاب تحليل الغذائية . كلية الزراعة . جامعة الموصل	
Websites	– Selected peer-reviewed publications from journals like <i>Journal of Food Science, Food Chemistry, Journal of Agricultural and Food Chemistry</i> , etc. ☐	

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
معلومات المادة الدراسية				
Module Title	Food Poisoning		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 206			
ECTS Credits	7			
SWL (hr/se3m)	175			
Module Level	TWO	Semester of Delivery		
Administering Department	Biotechnology and	College	Technical Agricultural College	

	Food Science		
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	☐ Understand the causes and types of food poisoning. ☐ Identify common foodborne pathogens and toxins. ☐ Recognize symptoms and diagnosis methods of food poisoning. ☐ Learn prevention and control strategies. ☐ Analyze real-life cases and outbreaks. ☐ Apply food safety practices to reduce contamination risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the different types and causes of food poisoning. Identify major foodborne pathogens, toxins, and their sources. Describe the symptoms and diagnosis methods for food poisoning cases. Apply proper hygiene and food safety practices to prevent contamination. Evaluate food poisoning outbreaks and suggest control measures. Demonstrate basic laboratory skills for detecting foodborne microbes.
Indicative Contents المحتويات الإرشادية	Introduction to Food Poisoning Types of Food Poisoning Sources and Routes of Food Contamination Bacterial Foodborne Pathogens Viral and Parasitic Foodborne Pathogens Natural Toxins in Food Chemical Contaminants in Food

	Part A - Theoretical Part 1. Introduction to Ecology and Animal Behavior: Introduction to the basics of ecology and animal behavior and their importance in the animal world. 2. Organization of animal communities: Study the role of organization and balance in animal communities and how it can affect the environment. 3. Handling animals on the farm: Learn the best ways to deal with animals on the farm, including health care, nutrition and training. 4. The effect of environmental factors on animal behavior: Study how environmental factors such as weather and location affect animal behavior and how it can adapt to these changes. 5. Organizing special care for each animal: Learn the skills needed to provide appropriate care for each animal based on its individual needs. 6. Evaluation and self-evaluation: Continuous assessment of progress and improvement, including self-evaluation and theoretical and practical evaluation.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Project-based learning: Students can conduct research projects on animal behavior in specific environments. This can include direct observation of animals in their natural environment or academic research. 2. Exploration-based learning: Students can explore natural environments and observe how animal behavior is affected by their environment. This can include field visits. 3. Collaborative learning: Students can work together in groups to study animal behavior and the environment. This can include working on research projects or group discussions. 4. Story-based learning: Educational stories and films can be used to illustrate how animal behavior is affected by their environment. This can include real-life or fictional stories. 5. Research-based learning: Students can conduct independent research on specific topics related to animal ecology and behavior.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Food Poisoning
Week 2	Types of Food Poisoning
Week 3	Sources of Food Contamination
Week 4	Bacterial Causes of Food Poisoning
Week 5	Viruses and Parasites Causing Food Poisoning
Week 6	Natural Toxins in Foods
Week 7	Chemical Food Poisoning
Week 8	Routes of Food Contaminant Transmission
Week 9	Symptoms and Clinical Diagnosis
Week 10	High-Risk Populations
Week 11	Types of animal behavior. Aggressive behavior. Sexual behavior. And mechanisms of sexual behavior
Week 12	Prevention of Food Poisoning
Week 13	Role of Regulatory Agencies
Week 14	Food Poisoning in Food Establishments
Week 15	Management of Food Poisoning Cases

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للجزء العملي

	Material Covered
Week 1	Laboratory Safety and Hygiene
Week 2	Sampling and Sample Preparation
Week 3	Sampling and Sample Preparation
Week 4	Detection of Total Bacterial Count in Food Samples
Week 5	Detection of Total Bacterial Count in Food Samples
Week 6	Isolation of Salmonella and E. coli
Week 7	Isolation of Salmonella and E. coli
Week 8	Biochemical Tests for Bacterial Identification
Week 9	Biochemical Tests for Bacterial Identification
Week 10	Detection of Fungal Contamination (Molds and Yeasts)
Week 11	Detection of Fungal Contamination (Molds and Yeasts)
Week 12	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 13	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 14	Food Poisoning Case Simulation & Reporting
Week 15	Food Poisoning Case Simulation & Reporting

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Food Microbiology: Fundamentals and Frontiers" <i>By Michael P. Doyle, Robert L. Buchanan</i> – Covers foodborne pathogens, lab detection techniques, and outbreak case studies.	Yes
Recommended Texts	التسمم الغذائي	No
Websites	Codex Alimentarius (FAO/WHO) Website: www.fao.org/fao-who-codexalimentarius – International food safety standards, including microbial limits and toxins.	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

-MODULE DESCRIPTION FORM

level 3

Biotechnology and Food Science

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
Module Title	Dairy Chemistry	Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	BFS 300	
ECTS Credits	6	
SWL (hr/sem)	150	

Module Level	2	Semester of Delivery	3
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	The student learns about the biochemical processes that occur within a plant in order for it to obtain food, grow, and produce.
Module Learning Outcomes	5- The course mainly identifies students on how to find out their military membership and non-vehicle status 6- Membership is focused on medically relevant topics 7- Knowledge of the biological and metabolic interactions within the human body and their relationship to diseases arising from disorders Metabolites and antiviral chemical clothing 8- Scientific knowledge of scientific techniques in a new medical procedure
Indicative Contents	- Part A - - Definition of the biochemistry , historical brief scope of the biochemistry . correlation [5] - Lipids (fatty materials) and fatty acids [5]. - Enzymes , vitamins , coenzymes [5]. - Metabolism of carbohydrates (brief) [5] - Part B - PH , Buffer solution , indicators , Physical Biochemistry colloids , imbibitions , viscosity . adsorption [10]. - Effect of the bases and acids on saccharides, Physical properties of fatty material [10]. - iodine No. polenski No. , Acydy no ., Millons test , sakoguchs test Aldenylde test .[10]. - Nucleic acids , metabolism of proteins , and others .[10].

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

1			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
Week	Material Covered
Week 1	Definition of the biochemistry , historical brief scope of the biochemistry . correlation
Week 2	Importance of the cell in the study of the biochemistry , Brief deception to the physical
Week 3	Water and reaction degree (PH)
Week 4	Chemistry of the carbohydrates
Week 5	Amino acids
Week 6	Peptides
Week 7	Lipids (fatty materials) and fatty acids
Week 8	Nudeo acids
Week 9	Enzymes , vitamins , coenzymes
Week 10	Bioenergetic (out lines)
Week 11	Bioenergetic (out lines)
Week 12	Metabolism of carbohydrates (brief)
Week 13	Metabolism of carbohydrates (brief)

Week 14	Metabolism of carbohydrates (brief)
Week 15	Metabolism of carbohydrates (brief)

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	PH , Buffer solution , indicators .
Week 2	Physical Biochemistry colloids , imbibitions , viscosity . adsorption .
Week 3	Reduction of the Benedict solutions Bar foods solution .
Week 4	Reduction of the, mono sacchordes formations of the ozazon fchilink test .
Week 5	Effect of the bases and acids on sacchorides
Week 6	Physical properties of different types of sacchorides
Week 7	Physical properties of fatty material
Week 8	Fat constant's acid number saponification number .
Week 9	iodine No. polenski No. , Acydy no .
Week 10	Testes on the oils .
Week 11	Millons test , sakoguchs test Aldenyde test .
Week 12	Chemical analysis of the material prsteis solubility .
Week 13	Biuret test .
Week 14	Sengers test .
Week 15	Nudeo acids , metabolism of protam , and others .
Week 16	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	الكيمياء الحياتية د. طارق يونس احمد ولؤي عبد علي الهلالي 2012	Yes
Recommended Texts	bioChemistry, 2020	No

Websites	http://ocw.mit.edu/courses/biology/7-013-introductory-biology-spring-2013/
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Food Biology		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS303			
ECTS Credits	6			
SWL (hr/se3m)	150			
Module Level	One	Semester of Delivery		
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader	Ameen R. Ali		e-mail	ameen.r.ali@ntu.edu.iq
Module Leader's Acad. Title	Ass. Lecturer		Module Leader's Qualification	Master
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	Understand the principles of food processing and various preservation methods, such as pasteurization, sterilization, drying, and freezing. Understand the properties of raw food materials and the effects of processing on them. Implement the production steps of food products such as dairy, juices, jams, and others. Perform simple analyses to assess food quality and safety (e.g., moisture, protein, fat, pH). Adhere to food and laboratory safety standards during manufacturing and testing. Develop practical skills and teamwork within a laboratory or production environment. Professional preparation for work in the food industry or quality control.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student explains the basic principles of food manufacturing and preservation processes. Distinguishes between different manufacturing techniques and their impact on food quality. Applies simple food production steps in a safe and correct manner. Performs basic analyses to assess the quality of food products. Adheres to safety procedures in the laboratory and manufacturing environment. Works effectively within a team and prepares practical reports documenting experimental results. Evaluates the quality of food products according to approved standards.

Indicative Contents المحتويات الإرشادية	Introduction to the Food Industry
	Importance of the Food Industry
	Classification of Food Products
	Characteristics of Raw Food Materials
	Milk, Fruits, Vegetables, Meat, Grains
	Basic Manufacturing Processes
	Pasteurization, Sterilization, Drying, Freezing, Fermentation
	Food Preservation Techniques
	Heat Preservation, Refrigeration, Preservatives, Packaging
	Production of Some Processed Foods
	Dairy (Yogurt, Cheese)
	Juices and Jams
	Canned Foods and Pickles
	Food Quality and Safety
	Quality Standards
	Food Contaminants
	Production Line Hygiene
	Basic Nutritional Analysis
	Moisture, Fat, Protein, pH, Acidity
	Food Packaging

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Active Learning: Students are encouraged to actively participate in the learning process through hands-on experiences, group projects, and interactive activities. 2. Project-Based Learning: Students are assigned applied projects that require them to apply the concepts and skills they have learned in a real-world context. 3. Research-Based Learning: Students are encouraged to conduct their own research and explore topics of interest to them. 4. Collaborative Learning: Students are encouraged to work together in groups to solve problems and complete projects. 5. Self-Directed Learning: Students are encouraged to take responsibility for their own learning and develop independent learning skills. 6. Discussion-Based Learning: Students are encouraged to participate in group discussions to promote critical thinking and effective communication.
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Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	97	Unstructured SWL (h/w)	7
Total SWL (h/sem)	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The importance of food industries and how they emerged and developed
Week 2	Main food industries and methods used in establishing a new industry
Week 3	Food components
Week 4	Lipids
Week 5	Dyes (coloring materials)
Week 6	Oxidants and antioxidants
Week 7	Meat, white and fish proteins
Week 8	Sources of oils and fats:
Week 9	Spoilage of oils and fats
Week 10	Food preservation methods
Week 11	Freezing
Week 12	The effect of freezing on food
Week 13	Food packaging
Week 14	Thermal treatments
Week 15	Cans and their manufacture

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للجزء العملي

	Material Covered
Week 1	Determination of Moisture Content
Week 2	Determination of Ash Content
Week 3	Fat Content Determination (Soxhlet Method)
Week 4	Protein Content Determination (Kjeldahl Method)
Week 5	Carbohydrate Estimation (By Difference)
Week 6	Acidity and pH Measurement
Week 7	White Soft Cheese Production
Week 8	Yogurt Production
Week 9	Jam Production
Week 10	Juice Processing and Preservation
Week 11	Oil Quality Test – Peroxide Value
Week 12	Food Packaging and Labeling
Week 13	Mini Food Product Development Project
Week 14	Final Lab Exam & Report Submission
Week 15	Final Lab Exam & Report Submission

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الصناعات الغذائية	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

(50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	Automation of food factory management		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BFS 304			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	Four	Semester of Delivery		7
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	

Scientific Committee Approval Date		Version Number	
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Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. The structure of the animal chromosomes . 8. Introducing the student to the most important basic information about the Genetics, their structure, classification and arrangements. 9. Teaching and training the student to know the Animal Genetics and the general features of it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	4. The collection of useful information about the animal Genetics and Hereditary traits . 5. the students has a full knowledge of the Differentiation and identification different animal breed and breeding . 6. the students has a good knowledge of molecular techniques.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - theoretical part</u> The structure of the animal chromosome and gene expression analysis [3 hrs] The function of each part of the chromosome. [3 hrs]

Part B - practical part

The structure of the animal cell and the shape of each organelles. [9 hrs].

The structure of the animal chromosome and gene expression analysis. [9 hrs].

The structures of each animal chromosome and gene expression analysis. [9 hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 60 ساعة

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Cell, cell division
Week 2	Reproduction, ,
Week 3	Meiosis
Week 4	sex differences in animals
Week 5	Exam
Week 6	Genetic code and molecular structure of genes
Week 7	Johann Mendel, his experiments, ,
Week 8	general Mendelian equations
Week 9	dominant and recessive genes
Week 10	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 11	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 12	Lethal and semi-lethal genes
Week 13	, biosimilar genes,
Week 14	supervital genes
Week 15	Alleles and multiple effects

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

week	Material Covered
Week 1	Identify the components of the animal cell
Week 2	Problems on Mendel's first law, problems on back multiplication, problems on Mendel's second law
Week 3	Issues on incomplete dominance
Week 4	Issues on incomplete dominance
Week 5	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 6	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 7	Issues on the genetics of hair scarcity in cattle
Week 8	Issues on the inheritance of fur in rabbits
Week 9	Issues on the inheritance of crest shape in chickens
Week 10	Issues on the inheritance of sex determination in humans, issues on embryonic ratio
Week 11	Issues on the inheritance of color blindness in humans, issues on the inheritance of blood thinners
Week 12	Problems on connection, problems on transitivity, problems on complete connection
Week 13	Problems on connection, problems on transitivity, problems on complete connection
Week 14	Problems on Hardy-Weinberg's law, problems on embryonic replication

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Genetics Natasha Ramroop Singh, Kamloops, British Columbia Copyright Year: 2009	no
Websites	https://kidshealth.org/en/parents/about-genetics.html	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية						
Module Title	Food Quality Control		Module Delivery			
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar			
Module Code	BFS302					
ECTS Credits	2					
SWL (hr/sem)	50					
Module Level	Two	Semester of Delivery		Three		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College			
Module Leader			e-mail			

Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	This course aims to develop entrepreneurial skills among Food Science students by introducing them to the concepts of innovation and entrepreneurship, enabling them to create innovative food-related ideas and projects that meet market needs and provide effective solutions to challenges in the food sector.
Module Learning Outcomes	9. Understands the meaning of entrepreneurship and innovation. 10. Identifies opportunities and problems in the food sector. 11. Suggests new ideas for food-related projects. 12. Designs a simple business model. 13. Writes a basic business plan. 14. Works effectively in a team. 15. Presents ideas clearly and confidently. 16. Uses creative thinking to solve problems.
Indicative Contents	The course covers the basics of entrepreneurship and innovation in Food Science, focusing on idea generation, market analysis, and business model design. It includes design thinking skills, business plan preparation, marketing, and financing. Students also work on a group project to develop and present a food-related entrepreneurial idea by the end of the course.

Learning and Teaching Strategies

Strategies	Learning strategy is the method teachers and students use to organize the learning process to achieve the best understanding and skills. It relies on interactive activities, teamwork, and problem-solving to motivate students and effectively develop their abilities.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	• What is entrepreneurship and innovation?
Week 2	• How do we understand the food market?
Week 3	• How do we think entrepreneurially?
Week 4	• How do we analyze market opportunities?
Week 5	• How do we come up with new ideas?
Week 6	• What is design thinking?
Week 7	• How do we design a business model?
Week 8	• How do we plan a project?
Week 9	• How do we write a business plan?
Week 10	• How do we market our products?
Week 11	• Where do we get funding?
Week 12	• Laws and ethics in the food field
Week 13	• Examples of successful food projects
Week 14	• Working on a practical project
Week 15	• Presenting and learning from our projects

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<i>Food Entrepreneurship: Innovation and Business Opportunities</i> – Karina A. Stanley	no
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	Food Chemistry		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar		
Module Code	BFS 306				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		FOUR			Semester of Delivery
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail		
Module Leader's Acad. Title			Module Leader's Qualification		Master
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date			Version Number		

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	□ Understand fundamental biotechnology principles and how they apply to food. □ Learn how microorganisms, enzymes, and genetic tools are used in food production, processing, and preservation. □ Gain ability to assess and ensure food safety and quality using modern biotechnological methods. □ Explore issues around genetically modified organisms (GMOs), regulations, and ethical considerations. □ Develop basic lab skills: experiment design, data analysis, diagnostics in food biotechnology.
Module Learning Outcomes	□ Describe the basic principles of biotechnology and how they apply to food production, processing, and preservation. □ Explain the role of microorganisms, enzymes, and genetic engineering in developing new or improved food products. □ Identify risks from genetically modified organisms (GMOs), contaminants, or pathogens, and apply safety and quality control methods. □ Design simple experiments or processes in food biotechnology (e.g. fermentation, enzyme use), collect data, analyze results, and interpret conclusions.
Indicative Contents	Introduction to Biotechnology Definition of Biotechnology and its Historical Development Foundations and Methods of Biotechnology Foundations and Methods of Biotechnology and its Applications in Food Manufacturing Industrial Fermentations Types of Bioreactors Utilization of Food Industry Waste Utilization of Food Industry Waste in the Production of High-Economic Value Products Enzymes and Food Manufacturing Enzymes and Food Manufacturing New Developments in Food Biotechnology New Developments in Food Biotechnology

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3.13
Total SWL (h/sem)	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Introduction to Food Biotechnology
Week 2	Isolation and preservation of industrial microorganisms
Week 3	Methods of preserving industrial microbiological cultures
Week 4	Development methods used in biotechnology
Week 5	Liquid State Fermentation
Week 6	Solid State Fermentation
Week 7	Genetic improvement of industrial microorganisms
Week 8	Hybridization
Week 9	Metabolic pathways in industrial microorganisms
Week 10	Sources of industrial microorganisms and methods of preserving them
Week 11	Nutritional and growth requirements for industrial organisms
Week 12	Nutritional media
Week 13	Additives to food media
Week 14	Additives to food media
Week 15	Nutritional and growth requirements for industrial organisms
Week 16	exam

Delivery Plan (weekly practical)

week	Material Covered
Week 1	Biotechnology and Microbiology:
Week 2	Use of ultraviolet radiation for genetic disinfection
Week 3	Isolation of microorganisms from different sources
Week 4	Preparing the vaccine for the production process:
Week 5	Preservation of industrial microorganisms
Week 6	Fermenter
Week 7	Production of industrial alcohol (ethanol):
Week 8	baker's yeast production
Week 9	Yeast vitality and activity assessment:
Week 10	How to separate yeast cells
Week 11	Anatomy of the female reproductive system
Week 12	Preparation of bacterial and yeast vaccine:
Week 13	Preparation of bacterial and yeast vaccine:
Week 14	Mycelium vaccine preparation:
Week 15	Preparation of mold spore inoculum by solid culture method:
Week 16	Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Food Biotechnology, Second Edition by Anthony Pometto, Kalidas Shetty, Gopinadhan Paliyath & Robert E. Levin — covers microbial applications, genetic engineering, functional foods, safety, enzyme tech.	Yes
Recommended Texts	Applied Food Biotechnology (AFB) — applied studies: food production, enzymes, microbiology, packaging materials.	No
Websites	Wiley — has many textbooks and journal articles under Food Biotechnology subject.	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information						
معلومات المادة الدراسية						
Module Title	food chain		Module Delivery			
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar			
Module Code	BFS 307					
ECTS Credits	6					
SWL (hr/se3m)	150					
Module Level	FOUR	Semester of Delivery	5			
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College			
Module Leader		e-mail				
Module Leader's Acad. Title		Module Leader's Qualification				
Module Tutor		e-mail				

Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Identify sources of food contamination and their transmission. Understand personal hygiene practices for food handlers. Learn proper methods of food storage and preservation. Apply safe food handling and preparation techniques. Recognize the importance of food safety in preventing foodborne illnesses. Become familiar with food safety laws and standards. 5- Develop basic skills to inspect food for spoilage or contamination.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13- ? Explain the basic concepts of food safety and hygiene. 14- ? Differentiate between types and sources of food contamination. 15- ? Apply personal hygiene and safety practices in food handling. 16- ? Evaluate food storage and preservation methods for safety and quality. 17- ? Interpret food safety laws, regulations, and standards. 18- ? Analyze causes of foodborne illnesses and methods of prevention. 19- ? Conduct basic inspections to detect food spoilage or contamination.
Indicative Contents المحتويات الإرشادية	? Introduction to Food Safety and Hygiene ? Types and Sources of Food Contamination ? Personal and General Hygiene Practices ? Food Storage and Preservation Methods ? Safe Food Preparation and Serving ? Foodborne Diseases and Prevention ? Food Safety Laws and Regulations

	Part B - practical part Microscope and its parts. Types of microscopes and their functions. Animal cell shapes. Animal cell divisions. Anatomy of a type of farm animal, such as a rabbit.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	📌 Lectures and Presentations: To explain key concepts and theories. 📌 Group Discussions: To encourage sharing ideas and problem-solving. 📌 Practical Demonstrations: Hands-on practice for safe food handling and hygiene. 📌 Case Studies: Analyze real-life examples of food safety incidents. 📌 Quizzes and Assessments: To evaluate understanding and retention. 📌 Role-playing: Simulate food safety scenarios to apply knowledge. 📌 Field Visits: Visits to food processing or inspection facilities (if possible).

Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	22	Unstructured SWL (h/w)	1.46
Total SWL (h/sem)	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Food Safety: definitions, scope, importance; historical cases of foodborne illness.
Week 2	Types of Hazards in Food: biological, chemical, physical, allergenic hazards.
Week 3	Microorganisms & Foodborne Illnesses: pathogens, spoilage organisms, growth conditions.

Week 4	Food Contamination & Cross-Contamination: sources, routes, prevention.
Week 5	Hygiene & Sanitation Principles: facility sanitation, equipment, cleaning & disinfection.
Week 6	Personnel Hygiene and Training: hand washing, protective clothing, behavior in food handling.
Week 7	Water and Air Quality in Food Operations; Pest Control & Waste Management.
Week 8	Food Storage, Packaging, Temperature Control: shelf life, cold chain, packaging materials.
Week 9	Food Preservation Techniques: heat treatments, drying, freezing, novel / non-thermal methods.
Week 10	Food Additives, Preservatives & Residues: safe levels, regulations, chemical hazards.
Week 11	Food Safety Management Systems: GMP, GHP, PRPs (Prerequisite Programs).

Week 12	HACCP: Principles, Steps, Implementation, Verification & Validation.
Week 13	Standards & Certifications: ISO 22000, BRC, IFS, other international / regional food safety standards.
Week 14	Legal Aspects, Ethics, Traceability & Consumer Right: food labeling, recalls, trace backs.
Week 15	Emerging Risks & New Technologies: new pathogens, novel processing methods, food fraud, climate change impacts.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للجزء العملي	
	Material Covered
Week 1	Indicators Microbial
Week 2	Isolation of Bacillus bacteria
Week 3	Clostridium food poisoning bacteria
Week 4	• Food botulism poisoning:
Week 5	Perform serial dilutions of the sample to be detected.
Week 6	Isolation and cultivation of E. coli bacteria
Week 7	Isolation of Salmonella and Shigella bacteria
Week 8	Detection of Staphylococcus aureus bacteria
Week 9	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.
Week 10	Detection of Staphylococcus aureus bacteria
Week11	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.

Week12	Methods of taking, storing, and transporting food samples to the laboratory:
Week13	Health of food facility workers and methods of monitoring it
Week14	Methods of taking, storing, and transporting food samples to the laboratory:
Week15	Methods of taking, storing, and transporting food samples to the laboratory:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Institute of Food Science & Technology (IFST) — has many technical briefs, guidance documents, fact sheets, webinars on food safety, allergens, labelling etc. Institute of Food Science and Technology USDA National Agricultural Library — Food Safety Research Information Office; databases and guides to help with finding research on food safety. nal.usda.gov Food Safety: The Science of Keeping Food Safe (2nd Ed.)	Yes
Recommended Texts	Food Safety	Yas
Websites	https://www.perlego.com/book/992564/food-safety-the-science-of-keeping-food-safe-pdf?utm_source=chatgpt.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

(50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	(قيد المعالجة) راسب	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	Therapeutic Nutrition		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	DFS 308			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	FOUR	Semester of Delivery		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader		e-mail		
Module Leader's Acad. Title		Module Leader's Qualification		
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module			
Co-requisites module			

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	☐ Understand the principles of food analysis techniques. ☐ Identify major components of food (e.g., moisture, protein, fat, ash). ☐ Apply standard methods for analyzing food quality and composition. ☐ Interpret analytical data and evaluate food products. ☐ Ensure accuracy and reliability in laboratory testing. ☐ Recognize the importance of food analysis in safety and regulation.
Module Learning Outcomes	Explain the basic principles and importance of food analysis. Identify and describe common analytical techniques used in food testing. Perform standard laboratory procedures to analyze food components (e.g., moisture, fat, protein). Interpret and report analytical data accurately. Evaluate food quality and safety based on analysis results.
Indicative Contents	11. Introduction to Food Analysis – Importance, applications, and role in food quality control. 12. Sampling and Sample Preparation – Techniques for collecting and preparing samples for analysis. 13. Moisture and Ash Content Analysis – Methods for determining water and mineral content in food. 14. Protein Analysis – Kjeldahl and other methods to measure protein content. 15. Fat Analysis – Extraction methods (e.g., Soxhlet, solvent extraction). 16. Carbohydrate Analysis – Determination of sugars, starch, and dietary fiber. 17. Vitamin and Mineral Analysis – Techniques for detecting micronutrients in food. 18. Additives and Contaminants Detection – Analysis of preservatives, colorants, and harmful substances. 19. Instrumental Methods in Food Analysis – Use of spectrophotometry, chromatography, etc. 20. Quality Control and Data Interpretation – Ensuring accuracy, precision, and reporting results. Let me know if you need this tailored to a specific academic level or format!

Learning and Teaching Strategies	
Strategies	1. Explanation and clarification. 2. Lecturing. 3. Lecturing. 4. Playing videos and displaying images. 5. Daily and monthly exams.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	(High-Performance Liquid Chromatography, HPLC)
Week 2	Principles of Microbiological Assays
Week 3	Methods Microbiological
Week 4	(Reliability of Microbial Assays
Week 5	Poultry feeding with pellets: advantages and disadvantages, influencing factors
Week 6	Microbiological Assays and Feeding Tests
Week 7	Microbiological Methods for Assessing the Nutritional Value of Proteins)
Week 8	Enzymatic Methods In Food Analysis
Week 9	Determination of Inhibitors
Week 10	Electrophoresis
Week 11	Chromatography Gas
Week 12	(compounds of analysis Quantitative(
Week 13	Gas-liquid chromatography
Week 14	Flame atomic absorption spectrometer
Week 15	Chromatography distribution

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	Preparation of standard solutions
Week 2	Adjusting the acidity of solutions
Week 3	Humidity estimation
Week 4	ASH Determination
Week 5	Fat Determination
Week 6	Spectrophotometer
Week 7	Nuclear Magnetic Resonance
Week 8	Specific gravity and Refractive index
Week 9	Digestion Extraction
Week 10	Total protein estimation:
Week 11	DETERMINATION OF ACIDITY AND ORGANIC ACIDS
Week 12	determination Fiber)
Week 13	Chemical additives estimate
Week 14	Second hand estimate of the carbon dioxide
Week 15	)curve Standard

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	□ – Standard reference for validated analytical methods in food testing. □	
Recommended Texts	داللي ، باسل كامل و صادق حسن الحكيم . كتاب تحليل الغذائية . كلية الزراعة . جامعة الموصل	
Websites	– Selected peer-reviewed publications from journals like <i>Journal of Food Science</i>, <i>Food Chemistry</i>, <i>Journal of Agricultural and Food Chemistry</i>, etc. □	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
معلومات المادة الدراسية				
Module Title	Sugar and Dates		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 309			
ECTS Credits	6			
SWL (hr/se3m)	150			
Module Level	FOUR			
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	☐ Understand the causes and types of food poisoning. ☐ Identify common foodborne pathogens and toxins. ☐ Recognize symptoms and diagnosis methods of food poisoning. ☐ Learn prevention and control strategies. ☐ Analyze real-life cases and outbreaks. ☐ Apply food safety practices to reduce contamination risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the different types and causes of food poisoning. Identify major foodborne pathogens, toxins, and their sources. Describe the symptoms and diagnosis methods for food poisoning cases. Apply proper hygiene and food safety practices to prevent contamination. Evaluate food poisoning outbreaks and suggest control measures. Demonstrate basic laboratory skills for detecting foodborne microbes.
Indicative Contents المحتويات الإرشادية	Introduction to Food Poisoning Types of Food Poisoning Sources and Routes of Food Contamination Bacterial Foodborne Pathogens Viral and Parasitic Foodborne Pathogens Natural Toxins in Food Chemical Contaminants in Food

	Part A - Theoretical Part 1. Introduction to Ecology and Animal Behavior: Introduction to the basics of ecology and animal behavior and their importance in the animal world. 2. Organization of animal communities: Study the role of organization and balance in animal communities and how it can affect the environment. 3. Handling animals on the farm: Learn the best ways to deal with animals on the farm, including health care, nutrition and training. 4. The effect of environmental factors on animal behavior: Study how environmental factors such as weather and location affect animal behavior and how it can adapt to these changes. 5. Organizing special care for each animal: Learn the skills needed to provide appropriate care for each animal based on its individual needs. 6. Evaluation and self-evaluation: Continuous assessment of progress and improvement, including self-evaluation and theoretical and practical evaluation.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Project-based learning: Students can conduct research projects on animal behavior in specific environments. This can include direct observation of animals in their natural environment or academic research. 2. Exploration-based learning: Students can explore natural environments and observe how animal behavior is affected by their environment. This can include field visits. 3. Collaborative learning: Students can work together in groups to study animal behavior and the environment. This can include working on research projects or group discussions. 4. Story-based learning: Educational stories and films can be used to illustrate how animal behavior is affected by their environment. This can include real-life or fictional stories. 5. Research-based learning: Students can conduct independent research on specific topics related to animal ecology and behavior.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المناهج الاسبوع، ي النظري	
	Material Covered
Week 1	Introduction to Food Poisoning
Week 2	Types of Food Poisoning
Week 3	Sources of Food Contamination
Week 4	Bacterial Causes of Food Poisoning
Week 5	Viruses and Parasites Causing Food Poisoning
Week 6	Natural Toxins in Foods
Week 7	Chemical Food Poisoning
Week 8	Routes of Food Contaminant Transmission
Week 9	Symptoms and Clinical Diagnosis
Week 10	High-Risk Populations
Week 11	Types of animal behavior. Aggressive behavior. Sexual behavior. And mechanisms of sexual behavior
Week 12	Prevention of Food Poisoning
Week 13	Role of Regulatory Agencies
Week 14	Food Poisoning in Food Establishments
Week 15	Management of Food Poisoning Cases

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للجزء العملي

	Material Covered
Week 1	Laboratory Safety and Hygiene
Week 2	Sampling and Sample Preparation
Week 3	Sampling and Sample Preparation
Week 4	Detection of Total Bacterial Count in Food Samples
Week 5	Detection of Total Bacterial Count in Food Samples
Week 6	Isolation of Salmonella and E. coli
Week 7	Isolation of Salmonella and E. coli
Week 8	Biochemical Tests for Bacterial Identification
Week 9	Biochemical Tests for Bacterial Identification
Week 10	Detection of Fungal Contamination (Molds and Yeasts)
Week 11	Detection of Fungal Contamination (Molds and Yeasts)
Week 12	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 13	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 14	Food Poisoning Case Simulation & Reporting
Week 15	Food Poisoning Case Simulation & Reporting

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Food Microbiology: Fundamentals and Frontiers" <i>By Michael P. Doyle, Robert L. Buchanan</i> – Covers foodborne pathogens, lab detection techniques, and outbreak case studies.	Yes
Recommended Texts	التسمم الغذائي	No
Websites	Codex Alimentarius (FAO/WHO) Website: www.fao.org/fao-who-codexalimentarius – International food safety standards, including microbial limits and toxins.	

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

MODULE DESCRIPTION FORM

Module Information			
معلومات المادة الدراسية			
Module Title	Scientific research methodology		Module Delivery
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	TAMO 400		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	THREE	Semester of Delivery	
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	

Relation with other Modules			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	Providing the student with experience in how to design experiments, then collect data, classify it, analyze it, then summarize it and come up with a recommendation to solve the problem for which the experiment was conducted.
Module Learning Outcomes	Creating a solid scientific basis in the theoretical and practical aspects applied in the field of istical programs. Providing the student with the skill of collecting primary data and summarizing it to solve the problem to be studied
Indicative Contents	Indicative content includes the following. <u>Part A - theoretical part</u> Completely randomized design, advantages, disadvantages, use of the design if one observation is recorded for each experimental unit, A- if the number of repetitions is equal

	Part B - practical part
	Statistical analysis of data

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب 15 اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

MODULE DESCRIPTION FORM

Module Information				
Module Title	Butter and Ice Cream		Module Delivery	
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 400			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	FOUR	Semester of Delivery		
Administering Department	Biotechnology and Food Science		College	Technical Agricultural College
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	Master
Module Tutor			e-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
Prerequisite module	-	Semester	-
Co-requisites module	-	Semester	-

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	□ Understand fundamental biotechnology principles and how they apply to food. □ Learn how microorganisms, enzymes, and genetic tools are used in food production, processing, and preservation. □ Gain ability to assess and ensure food safety and quality using modern biotechnological methods. □ Explore issues around genetically modified organisms (GMOs), regulations, and ethical considerations. □ Develop basic lab skills: experiment design, data analysis, diagnostics in food biotechnology.
Module Learning Outcomes	□ Describe the basic principles of biotechnology and how they apply to food production, processing, and preservation. □ Explain the role of microorganisms, enzymes, and genetic engineering in developing new or improved food products. □ Identify risks from genetically modified organisms (GMOs), contaminants, or pathogens, and apply safety and quality control methods. □ Design simple experiments or processes in food biotechnology (e.g. fermentation, enzyme use), collect data, analyze results, and interpret conclusions.
Indicative Contents	Introduction to Biotechnology Definition of Biotechnology and its Historical Development Foundations and Methods of Biotechnology Foundations and Methods of Biotechnology and its Applications in Food Manufacturing Industrial Fermentations Types of Bioreactors Utilization of Food Industry Waste Utilization of Food Industry Waste in the Production of High-Economic Value Products Enzymes and Food Manufacturing Enzymes and Food Manufacturing New Developments in Food Biotechnology New Developments in Food Biotechnology

Learning and Teaching Strategies

Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.
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Student Workload (SWL)

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3.13
Total SWL (h/sem)	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	Introduction to Food Biotechnology
Week 2	Isolation and preservation of industrial microorganisms
Week 3	Methods of preserving industrial microbiological cultures
Week 4	Development methods used in biotechnology
Week 5	Liquid State Fermentation
Week 6	Solid State Fermentation
Week 7	Genetic improvement of industrial microorganisms
Week 8	Hybridization
Week 9	Metabolic pathways in industrial microorganisms
Week 10	Sources of industrial microorganisms and methods of preserving them
Week 11	Nutritional and growth requirements for industrial organisms
Week 12	Nutritional media
Week 13	Additives to food media
Week 14	Additives to food media
Week 15	Nutritional and growth requirements for industrial organisms
Week 16	exam

Delivery Plan (weekly practical)

week	Material Covered
Week 1	Biotechnology and Microbiology:
Week 2	Use of ultraviolet radiation for genetic disinfection
Week 3	Isolation of microorganisms from different sources
Week 4	Preparing the vaccine for the production process:
Week 5	Preservation of industrial microorganisms
Week 6	Fermenter
Week 7	Production of industrial alcohol (ethanol):
Week 8	baker's yeast production
Week 9	Yeast vitality and activity assessment:
Week 10	How to separate yeast cells
Week 11	Anatomy of the female reproductive system
Week 12	Preparation of bacterial and yeast vaccine:
Week 13	Preparation of bacterial and yeast vaccine:
Week 14	Mycelium vaccine preparation:
Week 15	Preparation of mold spore inoculum by solid culture method:
Week 16	Exam

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Food Biotechnology, Second Edition by Anthony Pometto, Kalidas Shetty, Gopinadhan Paliyath & Robert E. Levin — covers microbial applications, genetic engineering, functional foods, safety, enzyme tech.	Yes
Recommended Texts	Applied Food Biotechnology (AFB) — applied studies: food production, enzymes, microbiology, packaging materials.	No
Websites	Wiley — has many textbooks and journal articles under Food Biotechnology subject.	

Grading Scheme				
Group	Grade	Estimation	Marks %	Definition
Success Group (50 - 100)	A - Excellent	Excellence	90 - 100	Outstanding Performance
	B - Very Good	Very good	80 - 89	Above average with some errors
	C - Good	Good	70 - 79	Sound work with notable errors
	D - Satisfactory	Average	60 - 69	Fair but with major shortcomings
	E - Sufficient	Acceptable	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	Precipitate (in process)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	Precipitate	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

Module Information						
معلومات المادة الدراسية						
Module Title	Meat and Meat Products Technology		Module Delivery			
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar			
Module Code	BFS 401					
ECTS Credits	6					
SWL (hr/se3m)	150					
Module Level		FOUR	Semester of Delivery	5		
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College		
Module Leader			e-mail			
Module Leader's Acad. Title			Module Leader's Qualification			
Module Tutor			e-mail			

Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Identify sources of food contamination and their transmission. Understand personal hygiene practices for food handlers. Learn proper methods of food storage and preservation. Apply safe food handling and preparation techniques. Recognize the importance of food safety in preventing foodborne illnesses. Become familiar with food safety laws and standards. 6- Develop basic skills to inspect food for spoilage or contamination.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	20- ? Explain the basic concepts of food safety and hygiene. 21- ? Differentiate between types and sources of food contamination. 22- ? Apply personal hygiene and safety practices in food handling. 23- ? Evaluate food storage and preservation methods for safety and quality. 24- ? Interpret food safety laws, regulations, and standards. 25- ? Analyze causes of foodborne illnesses and methods of prevention. 26- ? Conduct basic inspections to detect food spoilage or contamination.
Indicative Contents المحتويات الإرشادية	? Introduction to Food Safety and Hygiene ? Types and Sources of Food Contamination ? Personal and General Hygiene Practices ? Food Storage and Preservation Methods ? Safe Food Preparation and Serving ? Foodborne Diseases and Prevention ? Food Safety Laws and Regulations

	Part B - practical part Microscope and its parts. Types of microscopes and their functions. Animal cell shapes. Animal cell divisions. Anatomy of a type of farm animal, such as a rabbit.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	📌 Lectures and Presentations: To explain key concepts and theories. 📌 Group Discussions: To encourage sharing ideas and problem-solving. 📌 Practical Demonstrations: Hands-on practice for safe food handling and hygiene. 📌 Case Studies: Analyze real-life examples of food safety incidents. 📌 Quizzes and Assessments: To evaluate understanding and retention. 📌 Role-playing: Simulate food safety scenarios to apply knowledge. 📌 Field Visits: Visits to food processing or inspection facilities (if possible).

Student Workload (SWL)

Structured SWL (h/sem)		Structured SWL (h/w)	
Unstructured SWL (h/sem)		Unstructured SWL (h/w)	
Total SWL (h/sem)	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Food Safety: definitions, scope, importance; historical cases of foodborne illness.
Week 2	Types of Hazards in Food: biological, chemical, physical, allergenic hazards.
Week 3	Microorganisms & Foodborne Illnesses: pathogens, spoilage organisms, growth conditions.

Week 4	Food Contamination & Cross-Contamination: sources, routes, prevention.
Week 5	Hygiene & Sanitation Principles: facility sanitation, equipment, cleaning & disinfection.
Week 6	Personnel Hygiene and Training: hand washing, protective clothing, behavior in food handling.
Week 7	Water and Air Quality in Food Operations; Pest Control & Waste Management.
Week 8	Food Storage, Packaging, Temperature Control: shelf life, cold chain, packaging materials.
Week 9	Food Preservation Techniques: heat treatments, drying, freezing, novel / non-thermal methods.
Week 10	Food Additives, Preservatives & Residues: safe levels, regulations, chemical hazards.
Week 11	Food Safety Management Systems: GMP, GHP, PRPs (Prerequisite Programs).

Week 12	HACCP: Principles, Steps, Implementation, Verification & Validation.
Week 13	Standards & Certifications: ISO 22000, BRC, IFS, other international / regional food safety standards.
Week 14	Legal Aspects, Ethics, Traceability & Consumer Right: food labeling, recalls, trace backs.
Week 15	Emerging Risks & New Technologies: new pathogens, novel processing methods, food fraud, climate change impacts.

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للجزء العملي	
	Material Covered
Week 1	Indicators Microbial
Week 2	Isolation of Bacillus bacteria
Week 3	Clostridium food poisoning bacteria
Week 4	• Food botulism poisoning:
Week 5	Perform serial dilutions of the sample to be detected.
Week 6	Isolation and cultivation of E. coli bacteria
Week 7	Isolation of Salmonella and Shigella bacteria
Week 8	Detection of Staphylococcus aureus bacteria
Week 9	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.
Week 10	Detection of Staphylococcus aureus bacteria
Week11	Distinguishing between pathogenic and non-pathogenic strains of S. aureus bacteria.

Week12	Methods of taking, storing, and transporting food samples to the laboratory:
Week13	Health of food facility workers and methods of monitoring it
Week14	Methods of taking, storing, and transporting food samples to the laboratory:
Week15	Methods of taking, storing, and transporting food samples to the laboratory:

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Institute of Food Science & Technology (IFST) — has many technical briefs, guidance documents, fact sheets, webinars on food safety, allergens, labelling etc. Institute of Food Science and Technology USDA National Agricultural Library — Food Safety Research Information Office; databases and guides to help with finding research on food safety. nal.usda.gov Food Safety: The Science of Keeping Food Safe (2nd Ed.)	Yes
Recommended Texts	Food Safety	Yas
Websites	https://www.perlego.com/book/992564/food-safety-the-science-of-keeping-food-safe-pdf?utm_source=chatgpt.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

(50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	(فيد المعالجة) راسب	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information				
Module Title	grain manufacturing		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS403			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	FOUR	Semester of Delivery		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	

Relation with other Modules			
Prerequisite module			
Co-requisites module			

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	☐ Understand the principles of food analysis techniques. ☐ Identify major components of food (e.g., moisture, protein, fat, ash). ☐ Apply standard methods for analyzing food quality and composition. ☐ Interpret analytical data and evaluate food products. ☐ Ensure accuracy and reliability in laboratory testing. ☐ Recognize the importance of food analysis in safety and regulation.
Module Learning Outcomes	Explain the basic principles and importance of food analysis. Identify and describe common analytical techniques used in food testing. Perform standard laboratory procedures to analyze food components (e.g., moisture, fat, protein). Interpret and report analytical data accurately. Evaluate food quality and safety based on analysis results.
Indicative Contents	21. Introduction to Food Analysis – Importance, applications, and role in food quality control. 22. Sampling and Sample Preparation – Techniques for collecting and preparing samples for analysis. 23. Moisture and Ash Content Analysis – Methods for determining water and mineral content in food. 24. Protein Analysis – Kjeldahl and other methods to measure protein content. 25. Fat Analysis – Extraction methods (e.g., Soxhlet, solvent extraction). 26. Carbohydrate Analysis – Determination of sugars, starch, and dietary fiber. 27. Vitamin and Mineral Analysis – Techniques for detecting micronutrients in food. 28. Additives and Contaminants Detection – Analysis of preservatives, colorants, and harmful substances. 29. Instrumental Methods in Food Analysis – Use of spectrophotometry, chromatography, etc. 30. Quality Control and Data Interpretation – Ensuring accuracy, precision, and reporting results. Let me know if you need this tailored to a specific academic level or format!

Learning and Teaching Strategies	
Strategies	1. Explanation and clarification. 2. Lecturing. 3. Lecturing. 4. Playing videos and displaying images. 5. Daily and monthly exams.

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	(High-Performance Liquid Chromatography, HPLC)
Week 2	Principles of Microbiological Assays
Week 3	Methods Microbiological
Week 4	(Reliability of Microbial Assays
Week 5	Poultry feeding with pellets: advantages and disadvantages, influencing factors
Week 6	Microbiological Assays and Feeding Tests
Week 7	Microbiological Methods for Assessing the Nutritional Value of Proteins)
Week 8	Enzymatic Methods In Food Analysis
Week 9	Determination of Inhibitors
Week 10	Electrophoresis
Week 11	Chromatography Gas
Week 12	(compounds of analysis Quantitative(
Week 13	Gas-liquid chromatography
Week 14	Flame atomic absorption spectrometer
Week 15	Chromatography distribution

Delivery Plan (Weekly Lab. Syllabus)

week	Material Covered
Week 1	Preparation of standard solutions
Week 2	Adjusting the acidity of solutions
Week 3	Humidity estimation
Week 4	ASH Determination
Week 5	Fat Determination
Week 6	Spectrophotometer

Week 7	Nuclear Magnetic Resonance
Week 8	Specific gravity and Refractive index
Week 9	Digestion Extraction
Week 10	Total protein estimation:
Week 11	DETERMINATION OF ACIDITY AND ORGANIC ACIDS
Week 12	determination Fiber)
Week 13	Chemical additives estimate
Week 14	Second hand estimate of the carbon dioxide
Week 15	)curve Standard

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	☐ – Standard reference for validated analytical methods in food testing. ☐	
Recommended Texts	داللي ، باسل كامل و صادق حسن الحكيم . كتاب تحليل الغذائية . كلية الزراعة . جامعة الموصل	
Websites	– Selected peer-reviewed publications from journals like <i>Journal of Food Science</i> , <i>Food Chemistry</i> , <i>Journal of Agricultural and Food Chemistry</i> , etc. ☐	

Grading Scheme

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية					
Module Title	Allergy and Food Analysis		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	BFS405				
ECTS Credits	8				
SWL (hr/se3m)	200				
Module Level		FOUR	Semester of Delivery		6
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail		
Module Leader's Acad. Title			Module Leader's Qualification		
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	☐ Understand the causes and types of food poisoning. ☐ Identify common foodborne pathogens and toxins. ☐ Recognize symptoms and diagnosis methods of food poisoning. ☐ Learn prevention and control strategies. ☐ Analyze real-life cases and outbreaks. ☐ Apply food safety practices to reduce contamination risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the different types and causes of food poisoning. Identify major foodborne pathogens, toxins, and their sources. Describe the symptoms and diagnosis methods for food poisoning cases. Apply proper hygiene and food safety practices to prevent contamination. Evaluate food poisoning outbreaks and suggest control measures. Demonstrate basic laboratory skills for detecting foodborne microbes.
Indicative Contents المحتويات الإرشادية	Introduction to Food Poisoning Types of Food Poisoning Sources and Routes of Food Contamination Bacterial Foodborne Pathogens Viral and Parasitic Foodborne Pathogens Natural Toxins in Food Chemical Contaminants in Food

	Part A - Theoretical Part 1. Introduction to Ecology and Animal Behavior: Introduction to the basics of ecology and animal behavior and their importance in the animal world. 2. Organization of animal communities: Study the role of organization and balance in animal communities and how it can affect the environment. 3. Handling animals on the farm: Learn the best ways to deal with animals on the farm, including health care, nutrition and training. 4. The effect of environmental factors on animal behavior: Study how environmental factors such as weather and location affect animal behavior and how it can adapt to these changes. 5. Organizing special care for each animal: Learn the skills needed to provide appropriate care for each animal based on its individual needs. 6. Evaluation and self-evaluation: Continuous assessment of progress and improvement, including self-evaluation and theoretical and practical evaluation.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Project-based learning: Students can conduct research projects on animal behavior in specific environments. This can include direct observation of animals in their natural environment or academic research. 2. Exploration-based learning: Students can explore natural environments and observe how animal behavior is affected by their environment. This can include field visits. 3. Collaborative learning: Students can work together in groups to study animal behavior and the environment. This can include working on research projects or group discussions. 4. Story-based learning: Educational stories and films can be used to illustrate how animal behavior is affected by their environment. This can include real-life or fictional stories. 5. Research-based learning: Students can conduct independent research on specific topics related to animal ecology and behavior.

Student Workload (SWL)			
Structured SWL (h/sem)		Structured SWL (h/w)	
Unstructured SWL (h/sem)		Unstructured SWL (h/w)	
Total SWL (h/sem)	200		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المناهج الاسبوع، ي النظري	
	Material Covered
Week 1	Introduction to Food Poisoning
Week 2	Types of Food Poisoning
Week 3	Sources of Food Contamination
Week 4	Bacterial Causes of Food Poisoning
Week 5	Viruses and Parasites Causing Food Poisoning
Week 6	Natural Toxins in Foods
Week 7	Chemical Food Poisoning
Week 8	Routes of Food Contaminant Transmission
Week 9	Symptoms and Clinical Diagnosis
Week 10	High-Risk Populations
Week 11	Types of animal behavior. Aggressive behavior. Sexual behavior. And mechanisms of sexual behavior
Week 12	Prevention of Food Poisoning
Week 13	Role of Regulatory Agencies
Week 14	Food Poisoning in Food Establishments
Week 15	Management of Food Poisoning Cases

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للجزء العملي

	Material Covered
Week 1	Laboratory Safety and Hygiene
Week 2	Sampling and Sample Preparation
Week 3	Sampling and Sample Preparation
Week 4	Detection of Total Bacterial Count in Food Samples
Week 5	Detection of Total Bacterial Count in Food Samples
Week 6	Isolation of Salmonella and E. coli
Week 7	Isolation of Salmonella and E. coli
Week 8	Biochemical Tests for Bacterial Identification
Week 9	Biochemical Tests for Bacterial Identification
Week 10	Detection of Fungal Contamination (Molds and Yeasts)
Week 11	Detection of Fungal Contamination (Molds and Yeasts)
Week 12	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 13	Detection of Aflatoxins or Other Mycotoxins (Demo or Simulation)
Week 14	Food Poisoning Case Simulation & Reporting
Week 15	Food Poisoning Case Simulation & Reporting

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Food Microbiology: Fundamentals and Frontiers" <i>By Michael P. Doyle, Robert L. Buchanan</i> – Covers foodborne pathogens, lab detection techniques, and outbreak case studies.	Yes
Recommended Texts	التسمم الغذائي	No
Websites	Codex Alimentarius (FAO/WHO) Website: www.fao.org/fao-who-codexalimentarius – International food safety standards, including microbial limits and toxins.	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 - 49)	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Information					
Module Title	Food Manufacturing and Packaging		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	BFS 406				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		TWO			Semester of Delivery
Administering Department		Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader			e-mail		
Module Leader’s Acad. Title			Module Leader’s Qualification		
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	10. The structure of the animal chromosomes . 11. Introducing the student to the most important basic information about the Genetics, their structure, classification and arrangements. 12. Teaching and training the student to know the Animal Genetics and the general features of it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. The collection of useful information about the animal Genetics and Hereditary traits . 8. the students has a full knowledge of the Differentiation and identification of different animal breeds and breeding . 9. the students has a good knowledge of molecular techniques.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - theoretical part</u> The structure of the animal chromosome and gene expression analysis [3 hrs] The function of each part of the chromosome. [3 hrs]

Part B - practical part

The structure of the animal cell and the shape of each organelles. [9 hrs].

The structure of the animal chromosome and gene expression analysis. [9 hrs].

The structures of each animal chromosome and gene expression analysis. [9 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The necessity of visiting to gain experience from others. Obtaining new scientific information in the field of scientific research (videos). Practical training in the field. Access to modern scientific literature. Participation in relevant scientific conferences. Scientific laboratories with other universities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 60 ساعة			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Cell, cell division
Week 2	Reproduction, ,
Week 3	Meiosis
Week 4	sex differences in animals
Week 5	Exam
Week 6	Genetic code and molecular structure of genes
Week 7	Johann Mendel, his experiments, ,
Week 8	general Mendelian equations
Week 9	dominant and recessive genes
Week 10	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 11	Incomplete dominance, inheritance of feather color and sex-influenced traits
Week 12	Lethal and semi-lethal genes
Week 13	, biosimilar genes,
Week 14	supervital genes
Week 15	Alleles and multiple effects

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

week	Material Covered
Week 1	Identify the components of the animal cell
Week 2	Problems on Mendel's first law, problems on back multiplication, problems on Mendel's second law
Week 3	Issues on incomplete dominance
Week 4	Issues on incomplete dominance
Week 5	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 6	Issues on the inheritance of a recessive lethal gene with a global phenotypic effect
Week 7	Issues on the genetics of hair scarcity in cattle
Week 8	Issues on the inheritance of fur in rabbits
Week 9	Issues on the inheritance of crest shape in chickens
Week 10	Issues on the inheritance of sex determination in humans, issues on embryonic ratio
Week 11	Issues on the inheritance of color blindness in humans, issues on the inheritance of blood thinners
Week 12	Problems on connection, problems on transitivity, problems on complete connection
Week 13	Problems on connection, problems on transitivity, problems on complete connection
Week 14	Problems on Hardy-Weinberg's law, problems on embryonic replication

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Genetics Natasha Ramroop Singh, Kamloops, British Columbia Copyright Year: 2009	no
Websites	https://kidshealth.org/en/parents/about-genetics.html	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية				
Module Title	Vegetable Oil Technology		Module Delivery	
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	BFS 407			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	Two	Semester of Delivery	Three	

Administering Department	Biotechnology and Food Science	College	Technical Agricultural College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

Module Objectives	This course aims to develop entrepreneurial skills among Food Science students by introducing them to the concepts of innovation and entrepreneurship, enabling them to create innovative food-related ideas and projects that meet market needs and provide effective solutions to challenges in the food sector.
Module Learning Outcomes	17. Understands the meaning of entrepreneurship and innovation. 18. Identifies opportunities and problems in the food sector. 19. Suggests new ideas for food-related projects. 20. Designs a simple business model. 21. Writes a basic business plan. 22. Works effectively in a team. 23. Presents ideas clearly and confidently. 24. Uses creative thinking to solve problems.
Indicative Contents	The course covers the basics of entrepreneurship and innovation in Food Science, focusing on idea generation, market analysis, and business model design. It includes design thinking skills, business plan preparation, marketing, and financing. Students also work on a group project to develop and present a food-related entrepreneurial idea by the end of the course.

Learning and Teaching Strategies

Strategies	Learning strategy is the method teachers and students use to organize the learning process to achieve the best understanding and skills. It relies on interactive activities, teamwork, and problem-solving to motivate students and effectively develop their abilities.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

Week	Material Covered
Week 1	• What is entrepreneurship and innovation?
Week 2	• How do we understand the food market?
Week 3	• How do we think entrepreneurially?
Week 4	• How do we analyze market opportunities?
Week 5	• How do we come up with new ideas?
Week 6	• What is design thinking?
Week 7	• How do we design a business model?
Week 8	• How do we plan a project?
Week 9	• How do we write a business plan?
Week 10	• How do we market our products?
Week 11	• Where do we get funding?
Week 12	• Laws and ethics in the food field
Week 13	• Examples of successful food projects
Week 14	• Working on a practical project
Week 15	• Presenting and learning from our projects

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<i>Food Entrepreneurship: Innovation and Business Opportunities</i> – Karina A. Stanley	no
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 - 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

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Module Information				
معلومات المادة الدراسية				
Module Title	Biosecurity Safety		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	BFS 106			
ECTS Credits	8			
SWL (hr/se3m)	200			
Module Level	FOUR	Semester of Delivery		
Administering Department	Biotechnology and Food Science	College	Technical Agricultural College	
Module Leader		e-mail		
Module Leader's Acad. Title		Module Leader's Qualification		
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date		Version Number		

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	☐ Understand the causes and types of food poisoning. ☐ Identify common foodborne pathogens and toxins. ☐ Recognize symptoms and diagnosis methods of food poisoning. ☐ Learn prevention and control strategies. ☐ Analyze real-life cases and outbreaks. ☐ Apply food safety practices to reduce contamination risks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Explain the different types and causes of food poisoning. Identify major foodborne pathogens, toxins, and their sources. Describe the symptoms and diagnosis methods for food poisoning cases. Apply proper hygiene and food safety practices to prevent contamination. Evaluate food poisoning outbreaks and suggest control measures. Demonstrate basic laboratory skills for detecting foodborne microbes.
Indicative Contents المحتويات الإرشادية	Introduction to Food Poisoning Types of Food Poisoning Sources and Routes of Food Contamination Bacterial Foodborne Pathogens Viral and Parasitic Foodborne Pathogens Natural Toxins in Food Chemical Contaminants in Food

	Part A - Theoretical Part 1. Introduction to Ecology and Animal Behavior: Introduction to the basics of ecology and animal behavior and their importance in the animal world. 2. Organization of animal communities: Study the role of organization and balance in animal communities and how it can affect the environment. 3. Handling animals on the farm: Learn the best ways to deal with animals on the farm, including health care, nutrition and training. 4. The effect of environmental factors on animal behavior: Study how environmental factors such as weather and location affect animal behavior and how it can adapt to these changes. 5. Organizing special care for each animal: Learn the skills needed to provide appropriate care for each animal based on its individual needs. 6. Evaluation and self-evaluation: Continuous assessment of progress and improvement, including self-evaluation and theoretical and practical evaluation.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Project-based learning: Students can conduct research projects on animal behavior in specific environments. This can include direct observation of animals in their natural environment or academic research. 2. Exploration-based learning: Students can explore natural environments and observe how animal behavior is affected by their environment. This can include field visits. 3. Collaborative learning: Students can work together in groups to study animal behavior and the environment. This can include working on research projects or group discussions. 4. Story-based learning: Educational stories and films can be used to illustrate how animal behavior is affected by their environment. This can include real-life or fictional stories. 5. Research-based learning: Students can conduct independent research on specific topics related to animal ecology and behavior.

Student Workload (SWL)			
Structured SWL (h/sem)		Structured SWL (h/w)	
Unstructured SWL (h/sem)		Unstructured SWL (h/w)	
Total SWL (h/sem)	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Simple introduction to biosecurity and its importance in food
Week 2	What are microorganisms? (Bacteria, viruses, fungi)
Week 3	How do microorganisms spread in food?
Week 4	Causes of biological food contamination
Week 5	Basics of personal hygiene when handling food
Week 6	Concept of sterilization and disinfection and why we need them
Week 7	Personal protective equipment: gloves, masks, clothing
Week 8	How to organize the workplace to prevent contamination
Week 9	Common foodborne illnesses and their symptoms
Week 10	How to prevent food contamination in kitchens or factories
Week 11	Importance of safe food storage
Week 12	What to do in case of contamination? Simple control steps
Week 13	Practical examples and simple exercises in hygiene and disinfection

Week 14	Summary and practical application + field visit or educational video about biosecurity in food
Week 15	What to do in case of contamination? Simple control steps

Delivery Plan (Weekly Lab. Syllabus)	
Week	Material Covered
Week 1	Familiarization with lab and safety rules
Week 2	Microscope use: observing bacteria and fungi samples
Week 3	Hands-on practice: personal hygiene and proper handwashing
Week 4	Demonstration of sterilization techniques (boiling, chemical disinfectants)
Week 5	Practice wearing personal protective equipment (PPE)
Week 6	Cleaning and disinfecting a simple workstation
Week 7	Organizing a mock food preparation area for contamination prevention
Week 8	Identifying contamination points in food handling through role-play
Week 9	Sampling and testing for common foodborne pathogens (simplified)
Week 10	Proper storage of food samples and temperature monitoring
Week 11	Waste disposal exercises following biosecurity guidelines
Week 12	Simulated contamination scenario and control response
Week 13	Simple lab tests for detecting bacteria in food samples
Week 14	Group project: creating a biosecurity plan for a small food operation
Week 15	Review, practical exam, or virtual/field visit to food production facility

Student Workload (SWL)			
Structured SWL (h/sem)		Structured SWL (h/w)	
Unstructured SWL (h/sem)		Unstructured SWL (h/w)	

Total SWL (h/sem)	200
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
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	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
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