Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

٢٠٢٥ - ٢٠٢٦

Introduction:

The educational program is considered an organized and coordinated package of courses that includes procedures and experiences arranged in the form of course components. Its primary purpose is to develop and refine graduates' skills, enabling them to meet labor market requirements. The program is reviewed and evaluated annually through internal or external audit procedures and programs, such as the External Examiner Program.

The academic program description provides a concise summary of the main characteristics of the program and its courses, outlining the skills intended to be developed in students based on the objectives of the academic program. The importance of this description lies in its role as the cornerstone for obtaining program accreditation. It is prepared by the teaching staff under the supervision of the scientific committees within the academic departments.

This guide, in its second edition, includes a description of the academic program following the update of the contents and sections of the previous guide in light of the developments and advancements in the educational system in Iraq. It incorporates the academic program description in its traditional forms (annual and semester systems), in addition to adopting the generalized academic program description issued under the letter of the Department of Studies No. T.M.3/2906 dated 3/5/2023, concerning programs that adopt the Bologna Process as the basis for their operation.

In this regard, we can only emphasize the importance of preparing academic program and course descriptions to ensure the proper conduct of the educational process.

Concepts and Terminology:

Academic Program Description: Provides a concise summary of the academic program's vision, mission, and objectives, including an accurate description of the intended learning outcomes in accordance with specific learning strategies.

Course Description: Provides a concise summary of the key characteristics of the course and the expected learning outcomes that students are anticipated to achieve, demonstrating whether they have fully benefited from the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious image of the future of the academic program, aiming for it to be advanced, inspiring, motivating, realistic, and applicable.

Program Mission: Clarifies, in a concise manner, the objectives and activities required to achieve them, while also defining the pathways and directions for the program's development.

Program Objectives: Statements describing what the academic program intends to achieve within a specified period of time. These objectives should be measurable and observable.

Curriculum Structure: Includes all courses/modules incorporated within the academic program according to the adopted learning system (semester, annual, or Bologna Process), whether they are requirements at the level of the Ministry, University, College, or Academic Department, together with the number of credit units.

Learning Outcomes: A coherent set of knowledge, skills, and values acquired by students upon successfully completing the academic program. Learning outcomes should be specified for each course in a manner that achieves the program objectives.

Teaching and Learning Strategies: The strategies employed by faculty members to enhance student teaching and learning. These are plans followed to achieve learning objectives and include all classroom and extracurricular activities aimed at achieving the program learning outcomes.

Academic Program Description Form

University Name: Tikrit University
Faculty/Institute: College of Food Sciences, Shirqat
Scientific Department: Dairy Science and Technology
Academic or Professional Program Name: Bachelor's in Food Science
Final Certificate Name: Bachelor's of Food Science and Technology
Academic System: courses
Description Preparation Data: 2025-9-1
Completion Date: 2025-9-10

Signature:
Head of Department Name: Dr. Mohanad Hamad Saleh
Date: 2025-9-10

Signature:
Scientific Associate Name: Assis. Prof. Abdul Wahid Abdul Sattar Al-Taluh
Date: 2025-9-10

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department: Lecturer Katheer Ahmed Hussein
Date: 2025-9-10
Signature:

Approval of the Dean

1. Program Vision

The Department of Dairy Science and Technology was established starting from the academic year 2024–2025. The duration of study in the college is four years, upon completion of which graduates are awarded a Bachelor's degree in Food Science. The department admits graduates of the scientific branch of secondary education from both genders, as well as graduates of vocational education programs (Agricultural Branch and Food Industries Department). Graduates are qualified to work in scientific institutions and organizations operating in the fields of dairy science and technology and food sciences, contributing to the development and enhancement of local production within this sector.

2. Program Mission

The Department is committed to providing high-quality educational services at the undergraduate level and promoting the development of academic and applied research related to both academic qualifications and the resolution of industrial challenges. In addition, the department plays an advisory role in supporting and advancing activities within the field of Dairy Science and Technology.

In addition to its educational activities, the Department extends its functions to several other areas, including conducting scientific research, proposing appropriate solutions to challenges related to dairy technology, organizing local training courses, and holding workshops, seminars, and scientific conferences in collaboration with relevant local institutions and other universities. The Department also participates in joint supervision of research projects and contributes to the preparation of specialized scientific references and academic resources in the field of Dairy Science and Technology.

3. Program Objectives

- To prepare specialists and researchers qualified to work in scientific institutions and organizations, governmental and private factories, laboratories, and research centers operating in various fields of Dairy Science and Technology.
- To conduct applied research aimed at solving industrial challenges and improving product quality in factories and companies engaged in food processing and preservation.
- To provide specialized scientific consultations and appropriate solutions to challenges encountered in the food processing sector within the country.
- To organize specialized scientific conferences and seminars in the fields of Food Science and Dairy Technology, and to strengthen cooperation with local, regional, and international scientific institutions through scientific events and training programs in Dairy Science and Technology.
- To contribute to the preparation and provision of scientific references and educational resources in both Arabic and English related to topics in Dairy Science and Technology.
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4. Program Accreditation

Is the program accredited? If yes, by which accreditation body?
No.

5. Other External Factors

Is there any sponsoring body for the program?

No.

6 Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews•
Institution Requirements	٤	١٣	٥.٤١	
College Requirements	٢	٥	٢.٠٨	
Department Requirements	٢٢	٢٢٢	٩٢.٥	
Summer Training				
Other				

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First Year / First Semester	UOT001	Arabic Language	2	
First Year / First Semester	UOT003	Computer Applications	2	٢
First Year / First Semester	UOT004	Democracy and Human Rights	2	٢
First Year / First Semester	TUFSDT1102	Analytical Chemistry	2	٢
First Year / First Semester	TUFSDT1103	Mathematics	2	
First Year / First Semester	TUFSDT1104	Fundamentals of Workshop Engineering	2	٢
First Year / Second Semester	TUFSDT 1110	Physics	2	
First Year / Second Semester	TUFSDT 1111	Organic Chemistry	2	٢
First Year / Second Semester	TUFSDT 1112	Biostatistics	2	٢
First Year / Second Semester	TUFSDT 1113	Biological Safety and Biosecurity	2	٢
First Year / Second Semester	As determined by the University	English Language	2	
First Year / Second Semester	As determined by the University	Microbiology	2	٢
Second Year / First Semester	TUFSDT 1114	Dairy Microbiology	2	٢
Second Year / First Semester	TUFSDT 1115	Principles of Food Processing	2	٢
Second Year / First Semester	TUFSDT 1116	Dairy Plant Engineering	2	٢
Second Year / First Semester	TUFSDT 1117	Principles of Dairy Science	2	
Second Year / First Semester	As determined by the University	Arabic Language	2	٢
Second Year / First Semester	As determined by the University	Ba'ath Crimes	2	
Second Year / Second Semester	TUFSDT 1118	Computer Applications in Processing Units	2	
Second Year / Second Semester	TUFSDT 1119	Physical Chemistry	2	٢
Second Year / Second Semester	TUFSDT 1120	Biochemistry	2	٢
Second Year / Second Semester	TUFSDT 1121	Liquid and Powdered Milk Processing	2	٢
Second Year / Second Semester	TUFSDT 1122	English Language	2	٢

Second Year / Second Semester	TUFSDT 1123	Computer Applications	2	٢
Third Year / First Semester	TUFSDT 1124	Quality Control and Quality Assurance of Dairy Products	2	٢
Third Year / First Semester	TUFSDT 1125	Economics and Marketing of Dairy Products	2	
Third Year / First Semester	TUFSDT 1126	Dairy Chemistry	2	٢
Third Year / First Semester	TUFSDT 1127	Enzymology	2	٢
Third Year / First Semester	TUFSDT 1128	Starter Cultures and Fermentation Technology	2	٢
Third Year / First Semester	TUFSDT 1129	By-products and Environmental Pollutants of Dairy Products	2	٢
Third Year / Second Semester	TUFSDT 1130	Thermal and Non-thermal Food Processing	2	٢
Third Year / Second Semester	TUFSDT 1131	Fatty Dairy Products	2	٢
Third Year / Second Semester	TUFSDT 1132	Human Nutrition	2	٢
Third Year / Second Semester	TUFSDT 1133	Food Processing Technology	2	٢
Third Year / Second Semester	TUFSDT 1134	Wastewater and Effluent Treatment in Dairy Plants	2	٢
Third Year / Second Semester	TUFSDT 1135	Cheese Manufacturing	2	٢
Fourth Year / First Semester	TUFSDT 1136	Research Methodology	2	
Fourth Year / First Semester	TUFSDT 1137	Food Packaging	2	٢
Fourth Year / First Semester	TUFSDT 1138	Professional Ethics	2	٢
Fourth Year / First Semester	TUFSDT 1110	Evaluation and Development of Dairy Products	2	٢
Fourth Year / First Semester	TUFSDT 1111	Special and Novel Dairy Products Technology	2	
Fourth Year / First Semester	TUFSDT 1112	Nanotechnology Applications in Food Science	2	٢
Fourth Year / Second Semester	TUFSDT 1113	Food Analysis	2	٢
Fourth Year / Second Semester	As determined by the University	Ice Cream Technology	2	٢

Fourth Year / Second Semester	As determined by the University	Graduation Research Project	2	٢
Fourth Year / Second Semester	TUFSDT 1114	Dairy Microbiology	2	٢
Fourth Year / Second Semester	TUFSDT 1115	Principles of Food Processing	2	٢
Fourth Year / Second Semester	TUFSDT 1116	Dairy Plant Engineering	2	

8. Expected learning outcomes of the program

Knowledge

1. To enable students to acquire knowledge and understanding of the conceptual and skill-based framework of Dairy Science and Technology. 2. To enable students to gain knowledge of food and dairy processing methods. 3. To enable students to understand dairy microbiology and how to handle microorganisms in dairy products. 4. To enable students to acquire knowledge of the components of a healthy and safe diet. 5. To enable students to gain knowledge of dairy product technology, including cheese and fat-based products. 6. To enable students to understand internationally recognized laws and regulations related to food safety.	1. To enable the student to understand the fundamental principles of the required sciences. 2. To enable the student to comprehend the detailed scientific concepts required. 3. To enable the student to analyze recent scientific developments and advancements.

Skills

To enable students to solve problems related to dairy processing. To enable students to solve problems related to the production of dairy derivatives, including cheese and fat-based products. To enable students to address microbiological issues in milk and dairy products and manage microbial contamination. To enable students to solve problems related to milk and dairy contamination.	1. To develop a strong understanding of the principles of dairy science and familiarity with modern technologies such as nanotechnology applications. 2. To acquire technical competence in the field of specialization and the ability to monitor biological processes and conditions.

To enable students to solve problems related to ice cream and other dairy products manufacturing. To enable students to address issues arising from the interaction and overlap of production lines in processing units. To enable students to solve problems related to quality control units in food and dairy factories. To enable students to solve problems related to food and dairy preservation. To enable students to solve problems related to food and dairy packaging processes.	
Ethics	
Scientific Knowledge Graduates will be able to demonstrate a balanced understanding of how scientific and technological knowledge evolves, including the following concepts: • **Conducting practical experiments in food microbiology:** Students will be able to perform tests such as direct microbial counting and total plate count. • **Laboratory experiments in food and dairy chemistry:** Students will be capable of conducting complex experiments related to food quality and food processing operations using a variety of laboratory accessories. • **Application of microbiology:** Students will be able to conduct experiments related to general, food, and industrial microbiology. • **Analysis of food components:** Students will be able to conduct experiments related to determining moisture, ash, protein, fats, carbohydrates, and vitamins. • **Management of food production processes:** Students will be able to implement food production processes and procedures while observing appropriate safety protocols, including the principles and fundamentals of food manufacturing. • **Application of nanotechnology:** Students will be able to apply nanotechnology in food and dairy products, as well as understand the technology behind dates, meat, and fish products. • **Human nutrition knowledge:** Graduates	

will be able to demonstrate a balanced understanding of human nutrition and how modern scientific developments affect our dietary and health habits.	
Outcomes	Commitment to University Institutional Ethics

9. Teaching and Learning Strategies

1. Classroom education through theoretical and practical lectures.
2. Learning through organizing workshops, seminars, and specialized training courses in the field of Food Science and Technology.
3. Preparation of reports and scientific research.

10. Evaluation methods

1. Evaluative examinations.
2. Preparation and scientific discussion of research.
3. Writing reports accurately and in an organized manner.
4. Attendance and participation in daily activities.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements /Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	**Lecturer**
Assistant Professor	Biological Sciences	Environmental Science and Pollution			Muhannad Hamad Saleh	
Assistant Professor	Chemistry	Organic Chemistry			Abdulwahid Abdulsattar Talouh	
	Food Science				Ahmed Hamad Mohammed	

Lecturer	Biological Sciences	Parasitology			Aalaa Saleh Ali	
Lecturer	Soil Science	Soil Microbiology			Nouri Hamidi Mohammed	
Lecturer	Food Science	Physical Chemistry			Atheer Jasim Mohammed	
Lecturer	Agricultural Science	Agricultural Science			Khairallah Faraj Sabhan	
Lecturer	Agricultural Science	Agricultural Science			Muath Waad Okla	
Assistant Lecturer	Biological Sciences				Abdullah Mahmood Ajeel	
Assistant Lecturer	Biological Sciences				Katheer Ahmed Hussein	

Professional Development

Guiding New Faculty Members

New faculty members should be directed to focus on developing the academic curriculum, improving lecture delivery methods, and adopting effective strategies to communicate scientific material to students.

Professional Development for Faculty Members

Efforts should be made to organize training courses and workshops aimed at enhancing the skills and expertise of faculty members. These initiatives will help improve their teaching abilities and keep them updated with the latest developments in their fields.

12. Acceptance Criterion
Students graduating from secondary education, both the scientific branch and vocational education (Agricultural and Industrial streams – Food Industries), are admitted to the Department of Dairy Science and Technology.
13. The most important sources of information about the program
1. Textbooks and curriculum prescribed by the Ministry of Higher Education and Scientific Research. 2. External scientific sources. 3. Utilizing libraries and the internet.
14. Program Development Plan
The department prepares academic and research plans aimed at developing the department. These plans are formulated by the department head, the scientific committee, and the department council.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First / First course	UOT001	Arabic Language	B	√	√	√	√	√	√	√	√	√	√	√	√
	UOT003	Computer Applications	B	√	√	√	√	√	√	√	√	√	√	√	√
	UOT004	Democracy and Human Rights	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT1102	Analytical Chemistry	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT1103	Mathematics	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT1104	Fundamentals of Workshop Engineering	B	√	√	√	√	√	√	√	√	√	√	√	√
First / Second course	TUFSDT 1110	Physics	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1111	Organic Chemistry	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1112	Biostatistics	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1113	Biological Safety and Biosecurity	B	√	√	√	√	√	√	√	√	√	√	√	√
	As determined by the University	English Language	B	√	√	√	√	√	√	√	√	√	√	√	√
	As determined by the University	Microbiology	B	√	√	√	√	√	√	√	√	√	√	√	√
Second / First course	TUFSDT 1114	Dairy Microbiology	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1115	Principles of Food Processing	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1116	Dairy Plant Engineering	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1117	Principles of Dairy Science	B	√	√	√	√	√	√	√	√	√	√	√	√
	As determined by the University	Arabic Language	B	√	√	√	√	√	√	√	√	√	√	√	√

	As determined by the University	Ba'ath Crimes	B	√	√	√	√	√	√	√	√	√	√	√	√
Second / Second course	TUFSDT 1118	Computer Applications in Processing Units	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1119	Physical Chemistry	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1120	Biochemistry	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1121	Liquid and Powdered Milk Processing	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1122	English Language	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1123	Computer Applications	B	√	√	√	√	√	√	√	√	√	√	√	√
Third / First course	TUFSDT 1124	Quality Control and Quality Assurance of Dairy Products	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1125	Economics and Marketing of Dairy Products	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1126	Dairy Chemistry	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1127	Enzymology	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1128	Starter Cultures and Fermentation Technology	B	√	√	√	√	√	√	√	√	√	√	√	√
Third/second course	TUFSDT 1129	By-products and Environmental Pollutants of Dairy Products	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1130	Thermal and Non-thermal Food Processing	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1131	Fatty Dairy Products	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1132	Human Nutrition	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1133	Food Processing Technology	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1134	Wastewater and Effluent Treatment in	B	√	√	√	√	√	√	√	√	√	√	√	√

		Dairy Plants													
Fourth/ First course	TUFSDT 1135	Cheese Manufacturing	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1136	Research Methodology	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1137	Food Packaging	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1138	Professional Ethics	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1110	Evaluation and Development of Dairy Products	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1111	Special and Novel Dairy Products Technology	B	√	√	√	√	√	√	√	√	√	√	√	√
Fourth/ Second course	TUFSDT 1112	Nanotechnology Applications in Food Science	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1113	Food Analysis	B	√	√	√	√	√	√	√	√	√	√	√	√
	As determined by the University	Ice Cream Technology	B	√	√	√	√	√	√	√	√	√	√	√	√
	As determined by the University	Graduation Research Project	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1114	Dairy Microbiology	B	√	√	√	√	√	√	√	√	√	√	√	√
	TUFSDT 1115	Principles of Food Processing	B	√	√	√	√	√	√	√	√	√	√	√	√

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description: Food Microbiology

1. Course Name:

Microbial assay

2. Course code:

TUFSDT1114

3. Semester/Stage:

Chapter Two / Stage Two

4. Date this description was prepared:

25/1/2026

5. Available forms of attendance:

Attendance in the classroom

6. Number of study hours (total) / Number of units (total)

125 / 5

7. (Name of the course coordinator (if there is more than one name, mention it)

Dr. Noori Humaedi Muhammed Email: Noori.humedi@tu.edu.iq

8. Course Objectives:

This course aims to introduce students to the fundamental principles of food microbiology, with a focus on the types of microorganisms, their modes of life, and their relationship with food. The course addresses the classification of microorganisms of food significance and their association with food in relation to human life and daily activities. It also covers methods for utilizing beneficial microorganisms in food production, as well as techniques for food processing and preservation to protect against harmful microorganisms that cause food spoilage.

The course prepares students for work in food laboratories and health inspection fields. Upon completion, students are expected to be able to:

1. Identify the fundamental principles of food-related microbiology.
2. Understand the types of microorganisms of food importance and their roles in food spoilage and safety.
3. Acquire practical skills in the preparation, sterilization, and efficient use of culture media.
4. Develop proficiency in techniques for detecting microbial spoilage in food products.
5. Understand the physical and chemical factors influencing microbial growth and reproduction.
6. Apply microbiological tests used in evaluating food quality and safety.
7. Interpret laboratory test results and relate them to established standard specifications.
8. Be prepared to work in food analysis laboratories, health inspection, and quality control.

9. Teaching and learning strategies

The strategies used by a faculty member to develop student teaching and learning are plans that are implemented to achieve learning objectives and encourage students to participate in solving problems and performing calculations related to the curriculum.

10. Course Structure					
Week	**Hours**	**Required learning outcomes**	**Unit or topic name**	**Learning method**	**Evaluation Method**
The first	2	Students' knowledge of The importance of • microbial in food science Biosafety in the • microbiology laboratory	Introduction to Microbial Assay	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
The second	2	To enhance students' knowledge of bacteria, yeasts, and molds	Classification of food-associated microorganisms	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
The third	2	A comprehensive explanation of the sources of microbial pollution (primary and secondary pollution)	Sources of microbial contamination in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Fourth	2	Students' knowledge of the factors affecting microbial growth, including (temperature, humidity, pH, .(and water activity	Factors affecting the growth of microorganisms	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Fifth	2	To enable students to become familiar with the different types of culture media: general, selective, .and differential	Culture media: their types and preparation	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Sixth	2	Students' knowledge of microbial culture techniques, including: (surface culture, cast culture and striping) and comparison between .different counting methods	Microbial culture and counting techniques (direct and indirect counting methods)	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Seventh	2	.Midterm exam	.Midterm exam		Exams (monthly, daily) Homework
Eighth	2	Students' awareness of the importance of food quality	Microbiological indicators of food	Paper lecture, projector	Exams (monthly,

		and safety	quality and safety	screen, whiteboard and pen	daily) Homework
Ninth	2	Introducing students to and familiarizing them with pathogenic bacteria in food, such as: Salmonella, Staphylococcus aureus	Detection of pathogenic bacteria in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Tenth	2	Introducing students to the importance and impact of yeasts and molds on food	Assay of yeasts and molds in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Eleventh	2	Students' knowledge of interpreting the results of microbial tests, and knowledge of standard .microbial limits	Interpretation of microbial test results and standard microbial limits	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Twelfth	2	Students' familiarity with the applications of microbial assays in quality control, and knowledge of quality .systems and food safety	Applications of microbial assays in quality control	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Thirteenth	2	Students will learn about microbial assays in food processing plants, the role of assays in quality control, the interpretation of laboratory results according to standards, and decision-making based on test .results	Applications of microbial assays Interpretation of laboratory results according to standard specifications. Decision-making .based on test results	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Fourteenth	2	Introducing students to modern trends such as rapid methods in microbial counting, bioassay, and recent developments in food .safety	Modern trends in bioassay	Paper lecture, projector screen, whiteboard and pen	
Fifteenth	2	Students' familiarity with microbiological assays and .their applications	General review Practical discussion of case studies		

11. Course evaluation

Module Evaluation Course Material Assessment					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	All
	Assignments	2	10% (10)	9 and 13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. Learning and teaching resources

Required textbooks (methodology, if applicable)	
Main references (sources)	**1. Food Microbiology** Prepared by Prof. Dr. Fawzia Abdel-Razzaq Abdel-Rahman and Dr. Suleiman Taher Bousloum Omar Al-Mukhtar University/Libya **2. Food Microbiology** By: Martin R. Adams; Peter J. McClure; Maurice O. Moss DOI: https://doi.org/10.1039/9781837673698
Recommended supporting books and references (scientific journals, reports…)	**A Review of Modern Methods for the Detection of Foodborne Pathogens** by **Mohammed Aladhadh** Department of Food Science and Human Nutrition, College of Agriculture and Veterinary Medicine, Qassim University, Buraydah 51452, Saudi Arabia
Electronic references, websites	

Course Description

1. Course Name:
Microbiology of Food (Practical)
2. Course Code
TUFSDT1114
3. Semester/Year
2nd/Second
4. Date of this description:
February 11, 2026
5. Available Attendance Formats:
In-person
6. Total Credit Hours/Units:
Practical (125 hours)
7. Name of Course Instructor (If more than one, please specify(
Assistant Instructor kather ahmed hussen Email: Katheer.a.hussein@tu.edu.iq
8. Course Objectives
1. **Strictly apply biosafety and laboratory safety protocols.** 2. **Familiarize yourself with and correctly use the essential instruments and equipment ir microbiology laboratory.** 3. **Prepare culture media and solutions used in microbiological testing.** 4. **Conduct microbiological tests on various types of food (meat, fish, dairy, vegetabl beverages, etc.).** 5. **Isolate, cultivate, and enumerate different groups of microorganisms from food samples.** 6. **Evaluate the microbiological quality and safety of food based on laboratory results.**
9. Teaching and Learning Strategies
The main strategy for delivering this course is to encourage active student participation in exercis

while simultaneously improving and enhancing their critical thinking skills. This will be achiev through interactive lessons, interactive tutorials, and the integration of simple experiments w sampling activities to make it both educational and enjoyable for students.					
10. Course Structure					
week	**Hours**	**Required Learning Outcomes**	**Unit or Topic Name**	**Learning Method**	**Assessment Method**
1	**2**	**Introduction to microbiology and laboratory biology, understanding safety rules and avoiding self- or environmental contamination**	Laboratory 1: Introduction to Microbiology and Laboratory Safety	**Paper lecture, projector, whiteboard and marker**	**Exams (monthly, daily), Homework**
2	**2**	**Mastering the operation of basic equipment, incubators, autoclaves,**	Laboratory 2: Equipment and tools used in a microbiology laboratory	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
3	**2**	**Definition of meat, methods of slaughter, how it becomes contaminated, and how to take, isolate, and test a meat sample.**	Laboratory 3: Isolating microorganisms from meat and poultry	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
4	**2**	**Learn how to isolate organisms from fish and the reasons for their damage.**	Laboratory 4: Isolating microorganisms from fish and crustaceans	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
5	**2**	**Studying the microbial profile of**	Laboratory 5: Isolation of microorganisms	Paper lecture, projector,	**Exams (monthly,**

		eggshells: and testing egg safety from microbes	from eggs and their products	whiteboard and marker	**daily), Homework**
6	**2**	**Methods for isolating microorganisms from spoiled fruits and vegetables; taking samples of damaged tissue and culturing them; tips for avoiding contaminants.**	Laboratory 6: Isolating microorganisms from vegetables and fruits	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
7	**2**	Midterm exam		Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
8	**2**	**Canning steps, storage stability, and spoilage types.**	Lab 7: Isolation from Canned Foods	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
9	**2**	**Isolating microorganisms from grains and sugar.**	Lab 8: Isolation from Grains and Suga	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
10	**2**	**Link between pH levels and microbial types.**	Lab 9: Isolation from Drinking/Bottled Water	Paper lecture, projector, whiteboard and marker	**Exams (monthly, daily), Homework**
11	**2**	**Differentiating beneficial (starters) vs. pathogenic**	Lab 10: Isolation from Milk	Paper lecture, projector, whiteboard and	**Exams (monthly, daily),**

		microbes.		marker	**Homework**
12	**2**	**Differentiating beneficial vs. pathogenic microbes**	Lab 11: Isolation from Dairy Products	**Paper lecture, projector, whiteboard and marker**	**Exams (monthly, daily), Homework**
13	**2**	**Differentiating beneficial vs. pathogenic microbe**	Lab 12: Isolation from Fermented Milk	**Paper lecture, projector, whiteboard and marker**	**Exams (monthly, daily), Homework**
14	**2**	**Differentiating beneficial vs. pathogenic microbes**	Lab 13: Isolation from Cheese	**Paper lecture, projector, whiteboard and marker**	**Exams (monthly, daily), Homework**
15	**2**	**Link between pH levels and microbial types.**	Lab 14: Isolation from Juice and Soft Drinks	**Paper lecture, projector, whiteboard and marker**	**Exams (monthly, daily), Homework**

11. Course Evaluation

Module Evaluation

Course Material Assessment

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1 #2 and #10
	Assignments	2	10% (10)	2 and 12	LO #3 #4 #6 #7
	Projects / Lab.	1	10% (10)	continuous	All

	Report	1	10% (10)	13	LO #5 #8 and #10
Summative assessment	Midterm Exam	2hrs	10% (10)	7	LO #1 - #7
	Final Exam	3hrs	50% (50)	16	All
		Total assessment	100% (100 Marks)		

12. .Learning and teaching resources

Required textbooks (methodology, if applicable)	Riedel S, & Hobden J.A., & Miller S, & Morse S.A. Mietzner T.A., & Detrick B, & Mitchell T.G., & Sakar J.A., & Hotez P, & Mejia R(Eds.), (2019). Jaw Melnick, & Adelberg's Medical Microbiology, 2 McGraw H https://accesspharmacy.mhmedical.com/content.aspx ookid=2629&sectionid=217768734
Main references (sources).	WILLEY, J. M., SHERWOOD, L. M., WOOLVERTO C. J., & PRESCOTT, L. M. (2012). Presco principles of microbiology. New York, McGraw-Hill
Recommended supplementary books a references (scientific journals, reports, etc.)	
Electronic resources, websites	https://www.coursera.org/courses?query=microbiolog

Course Description **Physical Chemistry**

1. Course Name:
Physical Chemistry
2. Course code:
TUFSDT1115
3. Semester/Stage:
Chapter Two / First Stage
4. Date this description was prepared:
25/1/2026
5. Available forms of attendance:
Attendance in the classroom
6. Number of study hours (total) / Number of units (total)
125 / 5
7. (Name of the course coordinator (if there is more than one name, mention it)
Dr. Munaf Khalaf Mahmood . Email: munah.mahmood21@tu.edu.iq
8. Course Objectives:
governing chemical phenomena and reactions. The course focuses on **thermodynamics, chemical kinetics, chemical equilibrium, and electrochemistry**, emphasizing the relationship between physical concepts and chemical behavior. This course equips students with a quantitative and analytical understanding of chemical systems. By the end of this course, students are expected to be able to: 1. Understand the fundamental principles of physical chemistry and relate them to general chemistry and physics. 2. Interpret and apply the laws of thermodynamics to chemical systems. 3. Analyze factors affecting the rates of chemical reactions. 4. Understand chemical equilibrium and the factors influencing it. 5. Apply basic concepts of electrochemistry. 6. Use mathematical relationships to solve physical chemistry problems. 7. Develop quantitative analysis and scientific reasoning skills. 8. Prepare for advanced courses in physical chemistry, analytical chemistry, and industrial chemistry.

9. Teaching and learning strategies

1. Theoretical lectures supported by physical laws and mathematical equations.
2. Explanation of mathematical derivations related to physical chemistry concepts.
3. Solving numerical problems related to chemical reactions and systems.
4. Linking theoretical concepts to laboratory and industrial applications

10. Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
Assignments	Lecture	Introduction	Introduction to physical chemistry	2	First
Assignments	Lecture	Thermodynamic systems	Thermodynamic systems	2	Second
Assignments	Lecture	First law	First law of thermodynamics	2	Third
Assignments	Lecture	Second law	Second law and entropy	2	Fourth
Assignments	Lecture	Gibbs free energy	Gibbs free energy	2	Fifth
Assignments	Lecture	Chemical equilibrium	Chemical equilibrium	2	Sixth
Examination	—	Midterm Examination	—	2	Seventh
Assignments	Lecture	Kinetics theories	Reaction theories	2	Eighth
Assignments	Lecture	Temperature effects	Temperature effects	2	Ninth
Assignments	Lecture	Electrochemistry	Electrochemical cells	2	Tenth
Assignments	Lecture	Electrode potential	Nernst equation	2	Eleventh
Assignments	Lecture	Applications	Applications	2	Twelfth
Assignments	Discussion	Applications	Problem solving	2	Thirteenth
—	Discussion	General review	Review	2	Fourteenth

Assignments	Lecture	Kinetics theories	Reaction theories	2	Fifteenth

11. Course evaluation

Module Evaluation
Course Material Assessment

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	All
	Assignments	2	10% (10)	9 and 13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. Learning and teaching resources

Required textbooks (methodology, if applicable)	
Main references (sources)	**3. Physical Chemistry Atkins & de Paula** **4. Physical Chemistry Engel & Reid**
Recommended supporting books and references (scientific journals, reports…)	
Electronic references, websites	

Course Description

1. Course name:
Practical physical Chemist
2. Course code:
TUFSDT1115
3. the chapter/Year:Annual
First
4. Date this description was prepared
2026-02-2
5. Available attendance forms:
My presence/laboratory
6. Number of study hours (total) / Number of units (total):
125 hours
7. Name of the course administrator (if more than one name is mentioned)
Assistant teacher. Mohammed Khalaf. Mohammed
8. Course objectives
1. Training students in the use of laboratory tools and techniques 2. Applying the theoretical concepts and foundations of physical chemistry practically to better understand chemical processes. . 3. Enhance accuracy skills in measurements and handling of chemicals. 4. Preparing accurate laboratory reports that reflect the results and analyses that have been performed..
9. Teaching and learning strategies
The main strategy for delivering this course will focus on achieving a balance between theoretical knowledge and practical application, and includes the following: Direct practical explanation: Provide a practical explanation of the basic concepts and steps before starting the experiments. Assign students real-life problems that require the use of physical techniques to solve them..Divide students into small groups to carry out experiments together, which enhances teamwork and communication skills.

Role-playing among team members (e.g. preparation, measurement, documentation) to develop individual and team skills. Design experiments that give students the opportunity to discover physical principles for themselves through observation and inference. Ask open-ended questions that encourage critical thinking.Y.Providing digital educational tools and explanations such as videos, virtual reality simulations, and presentations. Train students on safety procedures and proper handling of chemicals and equipment.
Applying these strategies helps enhance students' scientific and practical skills, and prepares them to work efficiently in various fields of chemistry..

10. Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	Watches	The week
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Laboratory Safety and Familiarization with Glassware and Apparatus in physical Chemistry Laboratory	Learn about the general rules and guidelines for safety in the laboratory. Understand the importance of using personal protective equipment such as (lab coat, gloves, head covers, and goggles). Recognizing chemical symbols and hazards Identify the tools used in the laboratory (burette, volumetric flask, graduated cylinder, beaker, sensitive balances, electric oven)	2	1
Exams (monthly, daily) Home	Paper lecture, projector screen, whitebo	Determination of the Molecular Weight of a Volatile Liquid by the Dumas	The experiment of determining the molecular weight of a volatile liquid using Dumas method reflects the student’s ability to understand the theoretical	2	2

work	ard and pen	Method	basis of the transformation of a volatile liquid into vapor upon heating and how this is related to the ideal gas law.		
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	The experiment of the relationship between gas volume and temperature and the determination of molecular .weight	The learning outcomes of the experiment on the relationship between gas volume and temperature and the determination of molecular weight include the student's ability to understand the direct proportional relationship between gas volume and its absolute temperature according to Charles's law and to relate this to .the general behavior of gases	2	3
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Discussion of the reports of the first and second .experiments	Homework assignments and class discussions	2	4
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	TasksAssignments	Calculating the concentrations of substances required to prepare standard solutions Conduct an experiment using the materials and tools available in the laboratory.	2	5
Exams (monthly, daily)	Paper lecture, projector screen,	The experiment of determining the viscosity of a volatile liquid and finding the absolute and relative density	The learning outcomes of the experiment for determining the viscosity of a volatile liquid and finding its absolute and relative density include	2	6

Home work	whitebo ard and pen	of a volatile liquid .	the student's ability to understand the physical concept of viscosity, the factors affecting it, and its relation to the intermolecular attractive forces.		
Exam s (mont hly, daily) Home work	Paper lecture, projecto r screen, whitebo ard and pen	The experiment of determining the calorimeter constant	The learning outcomes of the experiment for determining the calorimeter constant include the student's ability to understand the concept of the calorimeter's heat capacity and how it affects the .measurement of thermal energy	2	7
Exam s (mont hly, daily) Home work	Paper lecture, projecto r screen, whitebo ard and pen	Discussion of the reports of the first and second experiments	. Homework assignments and class discussions	2	8
Exam s (mont hly, daily) Home work	Paper lecture, projecto r screen, whitebo ard and pen	TasksAssign ments	Give each student a model and ask him to identify the type of ion present and to use the approved working methods.	2	9
First month exam				2	10
Exam s (mont	Paper lecture, projecto	The experiment of determining the heat of neutralization of a strong acid	The learning outcomes of the experiment for determining the heat of neutralization of a strong acid and	2	11

hly, daily) Home work	r screen, whitebo ard and pen	and a strong base.	a strong base include the student's ability to understand the concept of heat of neutralization and how to measure the thermal change resulting from the reaction between the acid and the base		
Exam s (mont hly, daily) Home work	Paper lecture, projecto r screen, whitebo ard and pen	The experiment of determining the heat of neutralization of a weak acid and a strong base and finding the dissociation heat of the weak acid.	The learning outcomes of the experiment for determining the heat of neutralization of a weak acid and a strong base and finding the dissociation heat of the weak acid include the student's ability to understand the concepts of heat of neutralization and dissociation and how to measure the thermal change resulting from the reaction of the weak acid with the strong base.	2	12
Exam s (mont hly, daily) Home work	Paper lecture, projecto r screen, whitebo ard and pen	Discussion of Experiment Reports 5 and 6	Homework assignments and class discussions	2	13
Comprehensive review				2	14
Second month exam				2	15

11. Course Evaluation

Formative assessment = 40% (10% assignments + 10% homework + 10% report + 10% lab)
Midterm exam = 10%
Total (formative assessment + semester exam) = 50%
Final exam = 50%
Final grade = 100%

12.

Bio7th Edition of Physical Chemistry	Required textbooks (methodology if any

Fundamentals of Physical Chemistry Principles and Practice of Physical Chemistry	
Modern Physical Chemistry.	Main References (Sources)
https://en.wikipedia.org/wiki/ Physical chemistry	Electronic references, websites

Course Description **Biochemistry**

1. Course Name:
Biochemistry
2. Course code:
TUFSDT1116
3. Semester/Stage:
Chapter Two / Stage Two
4. Date this description was prepared:
25/1/2026
5. Available forms of attendance:
Attendance in the classroom
6. Number of study hours (total) / Number of units (total)
125 / 5
7. (Name of the course coordinator (if there is more than one name, mention it)
Email: Abdul.wahed@tu.edu.iq Asst. Prof. Dr. Abdulwahed Abdul Sattar Talouh
8. Course Objectives:
The **Biochemistry** course aims to introduce students to the chemical foundations of biological molecules and the reactions that occur within living cells, with an emphasis on the relationship between **chemical structure and biological function**. The course covers the study of proteins, carbohydrates, lipids, nucleic acids, and enzymes from an analytical and reaction-based chemical perspective, in addition to the fundamental principles of **biological metabolism and its regulation**. By the end of this course, students are expected to be able to: 1. Understand the fundamental principles of biochemistry and relate them to organic and physical chemistry. 2. Interpret the chemical structure of biological molecules and correlate it with their biological function. 3. Distinguish between different types of proteins and enzymes and understand their chemical properties. 4. Comprehend enzymatic reactions, mechanisms of catalysis, and the factors affecting enzyme activity. 5. Understand the basic metabolic pathways of carbohydrates and lipids from a chemical

perspective.

6. Analyze the role of energy (ATP) and coupled reactions in biological systems.
7. Develop the ability to relate chemical changes to cellular functions.
8. Prepare students for advanced courses in biochemistry, pharmaceutical chemistry, and food chemistry.

9. Teaching and learning strategies

The teaching of this course is based on:

1. Theoretical lectures supported by chemical equations and interactive diagrams.
2. Classroom discussions aimed at enhancing conceptual understanding.
3. Solving chemical problems related to biological reactions.
4. Linking theoretical concepts to practical applications in health, nutrition, and food sciences.

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10. Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
Exams, assignments	Lecture, whiteboard, presentation	Introduction to Biochemistry	Introduce students to the concept and importance of biochemistry	2	First
Exams, assignments	Lecture, examples	Water, pH, and weak interactions	Understand the role of water and chemical bonds in biological systems	2	Second
Exams, assignments	Lecture, problem solving	Carbohydrate Chemistry	Interpret the structure and function of carbohydrates	2	Third
Exams, assignments	Lecture	Glycolysis: a chemical perspective	Understand the chemical metabolism of carbohydrates	2	Fourth
Exams, assignments	Lecture	Lipid and Fat Chemistry	Recognize lipids from a chemical perspective	2	Fifth
Exams, assignments	Lecture	β-Oxidation and Energy	Understand fatty acid oxidation and energy production	2	Sixth

Seventh	2	.Midterm exam	.Midterm exam		Exams (monthly, daily) Homework
Exams	Lecture	Amino Acids	Interpret the chemical structure of amino acids	2	Eighth
Exams	Lecture	Proteins	Understand protein structure and influencing factors	2	Ninth
Exams	Lecture	Enzymes and Catalytic Mechanisms	Understand the nature of enzymes and biochemical reactions	2	Tenth
Exams	Lecture	Enzyme Kinetics	Analyze factors affecting enzyme activity	2	Eleventh
Exams	Lecture	DNA and RNA	Understand the structure and function of nucleic acids	2	Twelfth
Exams	Lecture	Metabolic Integration	Understand integrated metabolism	2	Thirteenth
Assignments	Discussion	Applications of Biochemistry	Relate biochemistry to practical applications	2	Fourteenth
—	Discussion	General Review	Consolidate fundamental concepts	2	Fifteenth
11. Course evaluation					

Module Evaluation Course Material Assessment					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	All
	Assignments	2	10% (10)	9 and 13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. Learning and teaching resources

Required textbooks (methodology, if applicable)	
Main references (sources)	**5. Harper's Illustrated Biochemistry** **6. Lehninger Principles of Biochemistry**
Recommended supporting books and references (scientific journals, reports…)	**Biochemistry – Stryer 1.** 2. Biochemistry – Voet & Voet
Electronic references, websites	

Course Description

13. Course name:
Bio Chemistry And Practi
14. Course code:
TUFSDT1115
15. the chapter/Year:Annual
First
16. Date this description was prepared
2026-2-2
17. Available attendance forms:
My presence/laboratory
18. Number of study hours (total) / Number of units (total):
125 hours
19. Name of the course administrator (if more than one name is mentioned)
Assistant teacher. Mohammed Khalaf. Mohammed
20. Course objectives
5. Training students in the use of laboratory tools and techniques 6. Applying the theoretical concepts and foundations of Bio chemistry practically to better understand chemical processes. . 7. Enhance accuracy skills in measurements and handling of chemicals. 8. Preparing accurate laboratory reports that reflect the results and analyses that have been performed..
21. Teaching and learning strategies
The main strategy for delivering this course will focus on achieving a balance between theoretical knowledge and practical application, and includes the following: Direct practical explanation: Provide a practical explanation of the basic concepts and steps before starting the experiments. Assign students real-life problems that require the use of Bio techniques to solve them..Divide students into small groups to carry out experiments together, which enhances teamwork and communication skills. Role-playing among team members (e.g. preparation, measurement, documentation) to develop individual and team skills. Design experiments that give students the opportunity to discover Bio principles for themselves through observation and inference. Ask open-ended questions that

encourage critical thinking.Y.Providing digital educational tools and explanations such as videos, virtual reality simulations, and presentations. Train students on safety procedures and proper handling of chemicals and equipment.
Applying these strategies helps enhance students' scientific and practical skills, and prepares them to work efficiently in various fields of chemistry..

22. Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	Watches	The week
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Laboratory Safety and Familiarization with Glassware and Apparatus in Bio Chemistry Laboratory	Learn about the general rules and guidelines for safety in the laboratory. Understand the importance of using personal protective equipment such as (lab coat, gloves, head covers, and goggles). Recognizing chemical symbols and hazards Identify the tools used in the laboratory (burette, volumetric flask, graduated cylinder, beaker, sensitive balances, electric oven)	2	1
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Carbohydrates	The learning outcomes for carbohydrates involve the student’s ability to define carbohydrates, explain their general chemical structure, and classify them into monosaccharides, disaccharides, and polysaccharides. It also includes distinguishing	2	2

			between reducing and non-reducing sugars, explaining their biological significance in living organisms, and interpreting the chemical reactions used to detect them in the laboratory while linking the test results to the sugar's structural composition.		
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Detection of Carbohydrates (Molisch Test)	The learning outcomes for the detection of carbohydrates using the Molisch test involve the student's ability to explain the underlying principle of the test, considering it a general test for carbohydrates. This includes interpreting the role of concentrated sulfuric acid in dehydrating the sugars and forming furfural derivatives, and linking the appearance of the violet ring at the interface to a positive result indicating the presence of carbohydrates. It also includes the ability to perform the experimental steps correctly and safely, and to interpret the results with scientific accuracy.	2	3
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and	Discussion of the Reports of the First and Second Experiments	Homework Assignments and Classroom Discussions	2	4

	pen				
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	TasksAssignments	Calculating the concentrations of substances required to prepare standard solutions Conduct an experiment using the materials and tools available in the laboratory.	2	5
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Benedict's Test	The learning outcomes for the Benedict's test involve the student's ability to define reducing sugars and explain the mechanism of the reduction of copper(II) ions to copper(I). This includes interpreting the color gradient resulting from the reaction and relating it to the sugar concentration in the sample, distinguishing between positive and negative results, and demonstrating the ability to draw a scientific conclusion about the nature of the sugar present in the solution.	2	6
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Fehling's Test	The learning outcomes for Fehling's test involve the student's ability to explain the components of Fehling's solution and the role of each in the reaction, interpret the formation of the red precipitate of copper(I) oxide as an indication of the	2	7

			presence of a reducing sugar, compare this test with Benedict's test in terms of principle and results, and accurately analyze the laboratory results.		
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Discussion of the Reports of the Third and Fourth Experiments	Homework Assignments and Classroom Discussions	2	8
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	TasksAssignments	Give each student a model and ask him to identify the type of ion present and to use the approved working methods.	2	9
First month exam				2	10
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Barfoed's Test	The learning outcomes for Barfoed's test involve the student's ability to distinguish between reducing monosaccharides and disaccharides based on the reaction rate, interpret the reason for the formation of the red precipitate in a short time in the case of monosaccharides, use the time factor as a criterion to	2	11

			differentiate between types of sugars, and demonstrate the ability to draw an accurate scientific conclusion from the results		
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Seliwanoff's Test	The learning outcomes for the Seliwanoff's test involve the student's ability to distinguish between ketose and aldose sugars, explain the role of resorcinol and hydrochloric acid in initiating the reaction, interpret the rapid appearance of a cherry-red color as an indication of the presence of a ketose sugar, and analyze the rate and intensity of the color development to accurately determine the type of sugar.	2	12
Exams (monthly, daily) Homework	Paper lecture, projector screen, whiteboard and pen	Discussion of Experiment Reports 6 and 7		2	13
Comprehensive review				2	14
Second month exam				2	15
23. Course Evaluation					
Formative assessment = 40% (10% assignments + 10% homework + 10% report + 10% lab) Midterm exam = 10% Total (formative assessment + semester exam) = 50%					

Final exam = 50% Final grade = 100% 24.	
Bio7th Edition of Bio Chemistry Fundamentals of Bio Chemistry Principles and Practice of Bio Chemistry	Required textbooks (methodology if any
ModernBio Chemistry.	Main References (Sources)
https://en.wikipedia.org/wiki/Bio_chemistry	Electronic references, websites

Course Description: Microbial Assay

1. Course Name:
Microbial assay
2. Course code:
TUFSDT1117
3. Semester/Stage:
Chapter Two / Stage Two
4. Date this description was prepared:
25/1/2026
5. Available forms of attendance:
Attendance in the classroom
6. Number of study hours (total) / Number of units (total)
125 / 5
7. (Name of the course coordinator (if there is more than one name, mention it)
Dr. Ahmed Hamad Muhammed Email: ahmed.aljandal@tu.edu.iq
8. Course Objectives:

This course aims to introduce students to the fundamental principles of food-associated microbiology assays, focusing on methods for counting and quantifying microorganisms in food products. The course covers the classification of foodborne microorganisms, methods for preparing culture media, microbial culture and counting techniques, and the factors influencing microbial growth. It also emphasizes the practical applications of microbial assays in food safety and quality control, and the interpretation of laboratory results according to established standards. This qualifies students to work in food and health control laboratories. Students are expected to be able to:

1. Recognize the fundamental principles of food-associated microbiology assays.
2. Understand the types of foodborne microorganisms and their role in food spoilage and safety.
3. Acquire practical skills in preparing, sterilizing, and efficiently using culture media.
4. Train students in quantitative and qualitative counting and quantifying techniques for microorganisms in food products.
5. Understand the physical and chemical factors influencing microbial growth and reproduction.
6. To develop students' ability to apply microbiological tests used in assessing food quality and safety.
7. To enable students to interpret laboratory test results and relate them to approved standards.

8.To prepare students to work in food analysis, health control, and quality control laboratories

9. Teaching and learning strategies

The strategies used by a faculty member to develop student teaching and learning are plans that are implemented to achieve learning objectives and encourage students to participate in solving problems and performing calculations related to the curriculum.

10. Course Structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
The first	2	Students' knowledge of The importance of • microbial assays in food science Biosafety in the • microbiology laboratory	Introduction to Microbial Assay	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
The second	2	To enhance students' knowledge of bacteria, yeasts, and molds	Classification of food-associated microorganisms	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
The third	2	A comprehensive explanation of the sources of microbial pollution (primary and secondary pollution)	Sources of microbial contamination in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Fourth	2	Students' knowledge of the factors affecting microbial growth, including (temperature, humidity, pH, .(and water activity	Factors affecting the growth of microorganisms	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Fifth	2	To enable students to become familiar with the different types of culture media: general, selective, .and differential	Culture media: their types and preparation	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Sixth	2	Students' knowledge of microbial culture techniques, including: (surface culture, cast culture and striping) and comparison between	Microbial culture and counting techniques (direct and indirect counting methods)	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework

		.different counting methods			
Seventh	2	.Midterm exam	.Midterm exam		Exams (monthly, daily) Homework
Eighth	2	Students' awareness of the importance of food quality and safety	Microbiological indicators of food quality and safety	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Ninth	2	Introducing students to and familiarizing them with pathogenic bacteria in food, such as: Salmonella, Staphylococcus aureus	Detection of pathogenic bacteria in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Tenth	2	Introducing students to the importance and impact of yeasts and molds on food	Assay of yeasts and molds in food	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Eleventh	2	Students' knowledge of interpreting the results of microbial tests, and knowledge of standard .microbial limits	Interpretation of microbial test results and standard microbial limits	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Twelfth	2	Students' familiarity with the applications of microbial assays in quality control, and knowledge of quality .systems and food safety	Applications of microbial assays in quality control	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework
Thirteenth	2	Students will learn about microbial assays in food processing plants, the role of assays in quality control, the interpretation of laboratory results according to standards, and decision-making based on test .results	Applications of microbial assays Interpretation of laboratory results according to standard specifications. Decision-making .based on test results	Paper lecture, projector screen, whiteboard and pen	Exams (monthly, daily) Homework

Fourteenth	2	Introducing students to modern trends such as rapid methods in microbial counting, bioassay, and recent developments in food .safety	Modern trends in bioassay	Paper lecture, projector screen, whiteboard and pen	
Fifteenth	2	Students' familiarity with microbiological assays and .their applications	General review Practical discussion of case studies		

11. Course evaluation

Module Evaluation
Course Material Assessment

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4 and 10	All
	Assignments	2	10% (10)	9 and 13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

12. Learning and teaching resources

Required textbooks (methodology, if applicable)	
Main references (sources)	**7. Food Microbiology** Prepared by Prof. Dr. Fawzia Abdel-Razzaq Abdel-Rahman and Dr. Suleiman Taher Bousloum Omar Al-Mukhtar University/Libya **8. Food Microbiology**

	By: Martin R. Adams; Peter J. McClure; Maurice O. Moss DOI: https://doi.org/10.1039/9781837673698
Recommended supporting books and references (scientific journals, reports…)	**A Review of Modern Methods for the Detection of Foodborne Pathogens** by **Mohammed Aladhadh** Department of Food Science and Human Nutrition, College of Agriculture and Veterinary Medicine, Qassim University, Buraydah 51452, Saudi Arabia
Electronic references, websites	

Course Description

1. Course Name:
English Language – 2
2. Course Code:
UOT003
3. Semester / Year:
2025-2026 – Second Semester
4. Description Preparation Date:
5. Available Attendance Forms:
Face to Face
6. Number of Credit Hours (Total) / Number of Units (Total)
50 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Assist. Lect. Atheer Jasim Mohammed Email: atherjandal@tu.edu.iq

8. Course Objectives

Course Objectives	1. To facilitate the learner to read, interpret and comprehend a variety of materials using a range of media. 2. To assist the learner to develop the language, literacy and numeracy skills related to English as a Foreign Language through the medium of the module themes and content. 3. To enable the learner to communicate effectively and appropriately in real life situation. 4. To develop interest in and appreciation of English language and grammar. 5. To develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing. 6. To revise and reinforce structure already learnt.

9. Teaching and Learning Strategies

Strategy	▪ Focus on academic language, literacy and vocabulary. ▪ Link background knowledge and culture to learning. ▪ Increase comprehensible input and language output. ▪ Promote classroom interaction. ▪ Stimulate higher-order thinking skills and use of learning strategies.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2		**Every day/ The Present Time**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
2	2		**Our World/ everyday life/ health/ food.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
3	2		**The world of the work/ present perfect and simple past.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
4	2		**Doing the right things/ Family and Friends/ Modal verbs.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
5	2		**Commonly used sentences**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
6	2		**Relationships**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
7	2		**Nutrition Facts/ vocabulary related to food.**		
8	2		**Directions and Prepositions.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
9	2		**Conditionals/ time clauses**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
10	2		**Weather and Forecast.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
11	2		**Requests and Offers/ Adverbs.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
12	2		**Some and any/ Like and I would like.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework

13	2		**Questions and Negatives.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
14	2		**Present continuous and Present simple.**	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework
15	2		**Future plans/ Revision**.	Lecture, Projector, Whiteboard, Marker	Exams (Monthly, Daily), Homework

11. Course Evaluation

12 .

Module Evaluation					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	15% (10)	5 and 10	LO #1, #3, #5 and #7
	Online Assignments	2	15% (10)	2 and 12	LO #2, #3 and #6
	Projects / Lab.				
	Report	1	10% (10)	13	LO #4, #6 and #7
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Learning and Teaching Resources		
Learning and Teaching Resources	**Text**	**Available in the Library?**
Required Texts	**John and Liz Soarse, *New Headway the New Edition: Pre- Intermediate*. Oxford: Oxford University Press, 2014.**	yes
Recommended Texts	**John and Liz Soarse, *New Headway Plus: Intermediate*. Oxford: Oxford University Press, 2019.**	No
Websites	**https://learnenglish.britishcouncil.org**	

1. Course Name:	
Information Technology subject	
2. Course Code:	
UOT003	
3. Semester / Year:	
2026-2025	
4. Description Preparation Date:	
٢٠٢٦/٢/٢	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60	
7. Course administrator's name (mention all, if more than one name)	
Name: Moath Waad Akla Email:: muaath.w.aoklh@tu.edu.iq	
8. Course Objectives	
Course Objectives	• Providing the Ministry of Education with staff specialized in teaching computer subject in secondary schools.... Providing the Ministry of Education with staff specialized in teaching computer subject in secondary schools.... • Providing students with technology skills that are applicable in various fields of education and life. • Teaching students the theoretical foundations on which the manufacture and discovery of the types of computers in the world depend
9. Teaching and Learning Strategies	

Strategy	1-Electronic lectures via electronic classes, including video lectures and presentations 2-Use thinking strategy 3-Brainstorming method

10. Course Structure

Week	Hours	Required Learning Outcomes		Learning method	Evaluation method
first	2	Computer basics	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Second	2	The development of computer generations	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Third	2	Electronic computer	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fourth	2	Classification of computers	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fifth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments between students and judgments of success and failure).
Sixth	2	Computer's components	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Seventh	2	Keyboard sections	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up,

					classroom calendar).
Eighth	2	System parts	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Ninth	2	Types of memory	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
tenth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments between students and judgments of success and failure).
eleventh	2	Software entity	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
twelveth	2	Computer platform	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Thirteenth	2	Factors to consider when purchasing a computer	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
fourteenth	2	Personal computer features	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fifteenth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments between students and judgments of success and failure).
first	2	Computer security	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Second	2	Computer security	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Third	2	Computer licenses	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fourth	2	Electronic hacking	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fifth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments

					between students and judgments of success and failure).
Sixth	2	Computer viruses	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Seventh	2	Computer harm to health	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Eighth	2	Operating Systems	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Ninth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments between students and judgments of success and failure).
tenth	2	Classification of operating systems	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
eleventh	2	New features in Windows	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
twelveth	2	Desktop components	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Thirteenth	2	Folders and files	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
fourteenth	2	Control panel keys	Computer	1-The illocutionary method. 2- Metacognition method. 3-Method of solving problems.	Formative or formative assessment (daily exams, class discussion, homework assignments and their follow-up, classroom calendar).
Fifteenth	2	Monthly exam	Computer	Presence	Personal evaluation (semester and final exams to issue differentiation judgments between students and judgments of success and failure).